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THE
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[THIRD SERIES, VOLUME XXI]

## ODONATA AND OTHER NEUROPTERA (SENS. LINN.) IN ROSS- AND SUTHERLAND-SHIRES.

BY KENNETH J. MORTON, F.R.E.S.

Having collected in West Ross during June, 1932, we decided to see what could be done in the eastern part of that county in July of the present summer. The lists that follow give the results, to which some items from other sources have been added. We lived at Hilton, near Culrain, some 300 or 400 ft. above sea-level, with a fine view over the Kyle of Sutherland. It was cooler up there in the fine weather, and when it became moister we had greater immunity from midges than we should have enjoyed lower down. The weather was fine up to July 12th as it had been during June; the moors were exceedingly dry and the water in small burns, if they were running at all, was at a low ebb. After the 13th, when it rained all day, the conditions entirely changed and there was no lack of water anywhere.

My principal collecting grounds were the wooded borders of the Kyle near Culrain, consisting mostly of oak, birch and alder, with some conifers nearby; fairly extensive coniferous plantations not far from the house; small burns running through the moors, and a lochan lying above Carbisdale Castle. We saw a good deal of both Ross and Sutherland as far north as Loch Assynt, Tongue and Durness, and as far west as Ullapool, as well as other places of interest. These longer excursions, on which we passed many alluring localities, left as a rule little or no time for collecting, even when the weather was favourable, which unfortunately was not always the case.

In an interesting article by F. J. Hanbury in this Magazine (Vol. XXXI, p. 1, 1895) he described Invershin (nearly opposite Culrain) as 'picturesquely situated on the Kyle of Sutherland, a fine expanse of brackish water extending many miles inland to the westward,' and he refers to Rosehall as being at the head of the

Kyle. In older maps the name seems to be so applied, being carried up Strath Oykell beyond Invershin to the point where the Cassley enters it. In recent references and maps which I have seen, the name is however apparently restricted to the stretch of water beginning at the narrows where the river Carron enters the Kyle and the head of the Kyle is stated to be at Invershin. As the Kyle receives the waters of the Oykell and the Shin, which with their tributaries drain a very extensive area of Sutherlandshire, to say nothing of the Carron, I think the salinity of the water at Invershin and Culrain must be almost negligible. The Leptoceridae (Trichoptera) noted by me at Culrain are species which frequent fresh waters (none of them excepting *Leptocerus cinereus* being mentioned by Silfvenius in his list of species found in the brackish waters of the Gulf of Finland at Tvärminne — Festschrift für Pdlmen, No. 14, Helsingfors, 1905), and they include at least two species which as far as I remember have not hitherto been recorded so far north in Scotland: *Oecetis testacea* Curt., which was quite common, and *Leptocerus dissimilis* Steph., of which a few were found about the end of the month.

As the majority of my captures were made in the neighbourhood of Culrain, East Ross, this locality should be understood unless otherwise stated. Loch Craggie (507 ft.) is also in East Ross, situated between Oykell Bridge and Altnacealgach, near the Sutherland county boundary.

## ODONATA.

### EAST ROSS.

*Lestes sponsa* Hans.—Tenerals at lochan, 9.vii; mature specimens 24th; pond near entrance to Strathcarron, mature ♀ on 15th.

*Ischnura elegans* Van der L.—One or two noted at lochan, 9.vii; evidently not common there.

*Enallagma cyathigerum* Charp.—Very common at lochan from 5.vii onwards; Strathcarron, 15.vii; Loch Craggie, 5.vii, common.

*Pyrrhosoma nymphula* Sulz.—From 4.vii onwards common at lochan and small moor burns; also at Loch Craggie.

*Cordulegaster annulatus* Latr.—Frequent at small burns and also coursing along margins of lochan throughout the month.

*Aeschna juncea* L.—First taken 9.vii, a ♀ in a pine wood near Culrain; on 10th several were seen in pine woods and along road-sides near the Allt Mor, one of the larger burns which fall into the Oykell five miles or so west of Culrain, a ♀ being taken; another ♀ (green form) taken on 18th when ovipositing in a small moor-pool quite near the house in which we were living.

*Ae. coerulea* Ström I did not see for certain. It was taken by King at L. Rosque, 8.vii.1890. His note (Ent. Mo. Mag., XXXVI, p. 136) says 'near L. Maree'; the latter loch is in West Ross, but the actual locality is on the east side of the watershed. The species was also taken by Col. Yerbury at Invershin in East Sutherland, 15.vii.1900 (Ent. Mo. Mag., XXXVI, p. 241);

this locality is, as already said, nearly opposite Culrain and separated only by the narrow Kyle, which is here spanned by the railway-bridge. The first *Aeschna* I saw at Culrain on 7th, but failed to capture, seemed to have too much blue on the abdomen for *juncea*, and may have been the other species from its behaviour. That *coerulea* occurs on both sides is very probable, although it may be only a temporary visitor on the low ground during the earlier part of its imaginal life, which, in a good season, may begin in the first days of June.

*Libellula quadrimaculata* L.—One frequented the pool near the house on 5th, and on the same day a good many were seen at the lochan; on later visits it was less in evidence.

The absence of *Sympetrum scoticum* was rather remarkable. It may have been merely that emergence was delayed through the weather being unfavourable in the second half of July, but perhaps the long continued drought resulting in the drying-up or at least great shrinkage of their breeding places may have had something to do with it. On my last visit to the lochan on the 29th a teneral took flight from the margin but it went off over the water and could not be followed. It was probably *scoticum*.

A mature female of *Sympetrum striolatum* was found sticking to the radiator of the motor when we made a short stop at Loch Droma on the 20th. As we had been that day in both counties it is impossible to say from where the dragonfly came, very likely, however, from some place between Ullapool and that loch. L. Droma (900 ft.) belongs to the western drainage, although it is practically on the summit level separating East from West Ross.

## EAST SUTHERLAND.

*Lestes sponsa.*—Teneral ♀ noted on 8th at a stretch of marsh by the roadside between Dornoch and the Mound.

*Ischnura elegans.*—At the same place. It also occurred commonly on 11th at the channel connecting L. Vanavie (L. á Bhainbh, about 300 ft.) with L. Shin; this channel runs through low-lying, marshy ground and is full of water-lilies.

*Pyrrhosoma nymphula* and *Enallagma cyathigerum* were also common here, and *Libellula quadrimaculata* was present. A road passing through pine woods leading to a bridge over the channel was frequented by a number of *Aeschna juncea*, of which three adult males were easily secured.

## WEST SUTHERLAND.

I take this opportunity of giving the substance of an apparently unpublished note by the late William Evans on a collection of dragonflies made by the late J. W. Bowhill, who was at the time at Keoldale, near Durness, in N.W. Sutherland. The specimens were taken on August 17th-18th, 1914, at Keoldale and near Scourie and included the following species: *S. striolatum*, 12 ♂♂ (1 ten.), 14 ♀♀ (6 ten.); *S. scoticum*, 7 ♂♂, 3 ♀♀, ad.; *Ae. juncea*, 1 ♂, ad.; *L. sponsa*, 3 ♂♂, 4 ♀♀; *P. nymphula*, 3 ♂♂; *I. elegans*, 7 ♂♂; *E. cyathigerum*, 3 ♂♂, 1 ♀. I have already recorded

Mr. Bowhill's captures of *L. quadrimaculata* at Loch Stack in the same district on May 24th, 1911 (E.M.M., LXVIII, p. 270).

To the best of my knowledge, the following is a complete list of the dragonflies that have occurred in the counties of Ross and Sutherland. The record of *Agrion hastulatum* requires confirmation; it was admitted by Mr. Evans (Ann. Scot. N.H., 1911, p. 24) I suppose on the strength of certain specimens in the Dale collection said to have been taken in Sutherland by Weaver (*cf.* Lucas, E.M.M., XLV, p. 81), but more recently Lucas (Aquatic Stage of Brit, Dfls., p. 113, 1930) quoted 'only one locality' in the north of Scotland as the sole habitat of the species in Britain, no doubt alluding to Aviemore.

| SPECIES. | W. Ross. | E. Ross. | E. Sutherland. | W. Sutherland. |
|---|---|---|---|---|
| *Leucorrhinia dubia* ................. | | × | | |
| *Sympetrum striolatum* ............ | × | | | × |
| *S. scoticum* ............................ | | × | × | × |
| *Libellula quadrimaculata* .......... | × | × | ×* | × |
| *Somatochlora arctica* .............. | × | | | |
| *Cordulegaster annulatus* .......... | × | × | × | × |
| *Aeshna coerulea* ..................... | | × | × | × |
| *Ae. juncea* ............................ | × | × | × | ×* |
| *Lestes sponsa* ........................ | | × | ×* | × |
| *Pyrrhosoma nymphula* ............ | × | × | ×* | × |
| *Ischnura elegans* .................... | × | ×* | ×* | × |
| *Agrion hastulatum* ................. | | | × | |
| *Enallagma cyathigerum* .......... | × | × | × | × |

No previous records of those species marked with an asterisk have been traced. The gaps in the distribution of *S. scoticum, Ae. coerulea* and *L. sponsa* will pretty surely be filled up in time. *L. dubia, S. striolatum* and *S. arctica* are perhaps less certain; *S. striolatum* is mainly western in its distribution in Scotland and the other two seem to be somewhat local.

After the Odonata, NEUROPTERA (*s. str.*) received most attention. With one exception all were taken in the Culrain district.

The CHRYSOPIDAE were represented by three species:

*Chrysopa flava* Scop. was not uncommon, especially on oaks on the lower ground bordering or near the Kyle.

*C. vittata* Wesm. occurred with the preceding but was not so frequent.

*C. ventralis* Curt. Of this a fine typical example with the markings well developed (including two spots on the vertex) was found in the net on the 17th along with a specimen of *C. vittata*; this was a surprise, as I had not seen the species before from Scotland and certainly never thought of its occurrence so far north.

I regret to say that no further specimens could be found. It is rather strange that *C. ciliata* Wesm., a widely distributed Scottish species, frequently associated with *C. flava* and *vittata* and occurring at least as far north as the Glen Affric district, N.W. Inverness, was an absentee rather difficult to account for.

Of HEMEROBIIDAE the following twelve species were met with:

*Hemerobius marginatus* Steph. and *H. lutescens* Fabr., on birch, oak and alder, were as common as I have ever seen them.

*H. simulans* Walk.—After a single old ♀ on 3rd I do not appear to have seen it again till 17th, when fresh specimens were taken, and nearer the end of the month it had become common. Evidently with a partiality for larch, it is also an adaptable species, as it frequently occurs on deciduous trees of different kinds as well as on other conifers.

*H. stigma* Steph.—This well-known species was not in its usual abundance, and I conclude we were between broods. The same view must be taken with regard to *H. atrifrons* McLach., of which only a single fresh ♂ was taken on 30th. (*H. pini*, which must surely occur, was not taken at all.) Of *H. micans* Oliv., one or two were taken on 3rd, then a lapse occurred until 30th. *H. nitidulus* Fabr. occurred throughout the month, but was not very numerous.

*Boriomyia nervosa* Fabr.—Not seen until 17th and only half-a-dozen taken between that date and the end of the month, all fresh specimens from birch and alder.

*B. mortoni* McLach.—A single ♀ only, on 4th. The coniferous wood in which it was found was only ten minutes from the house, and was therefore often visited, but I failed to find another example.

*Wesmaelius concinnus* Steph.—Did not occur to me in East Ross. A single ♀ was taken on 20th at L. Droma, from pines on the borders of the loch.

*W. quadrifasciatus* Reut. — Fairly well distributed, but not numerous; it occurred throughout the month, nearly always on larch.

*Sympherobius inconspicuus* McLach.—Not uncommon and generally distributed; always found on pine. Females only were taken, a like experience having happened in July, 1933, at Rothiemurchus: in the latter district King (Trans. Glasgow N. Hist. Soc., Vol. I, N.S., Pt. 3, 1887) reported the species as very common, but males rather scarce. I have seen but one ♂ this summer, found at Balerno, 28th June.

The foreging list is identical with that of Hemerobiidae found in Rothiemurchus Forest, East Inverness, in July, 1933, with two exceptions, namely: *H. pini*, absent from Ross, occurred in Rothiemurchus in small numbers, and *H. micans*, present in Ross, did not occur in Rothiemurchus in July, 1933, but occurred to me in the Forest in September, 1932. The number of individuals of some of the species, however, differed much; for example, the two common pine-frequenting species, *H. stigma* and *H. nitidulus*, were more abundant in Rothiemurchus, while the position of *W. concinnus* and *quadrifasciatus* was reversed in the two localities, the former having occurred frequently in Rothiemurchus and the latter being represented there by one example.

A few CONIOPTERYGIDAE collected from deciduous trees on the

3rd prove to be *Coniopteryx tineiformis* Curt. I intended to turn my attention to these small insects again later in the month, but they seemed to have been finished off by the heavy rains on and after the 13th, and I looked for them several times but could find none.

### MEGALOPTERA.

*Sialis fuliginosa* Pict.: a fair number of these were taken at a burn near the house on 4-6.vii. On the last date they were flying freely in the sunshine.

### MECOPTERA.

As *Panorpa germanica* was out in some numbers in Midlothian as early as June 1st, I fully expected to find it in Ross during July, but no *Panorpas* were seen there. This was disappointing, as I am not sure that any information has been published regarding this species or the var. *borealis* in the northern counties since King's captures of the latter and McLachlan's remarks thereon (E.M.M., Vol. XX, p. 141). It may be recalled that the former took a very large number of *borealis* at Tongue, Sutherlandshire, towards the end of July, 1883, and that no other form occurred there. A short series, for which I was indebted to my late friend, still lies before me. The only other specimen in my collection agreeing entirely with these practically immaculate-winged insects is one that I took at Rannoch (1-15.vii.1903), although I have one or two from other localities that closely approach it. But in all these cases the specimens were associated with others of a more or less ordinary kind. I may say that we were in Tongue and its neighbourhood on July 16th, but the day turned out wet.

### TRICHOPTERA.

My list of these is meagre and represents casual captures rather than special search. The species taken are:

*Phryganea varia* F., Loch Craggie.

*Glyphotaelius pellucidus* Retz.—Frequent from alders round water-holes at the side of the Kyle; these were dry in the early part of the month, but filled up after the rains—this, no doubt, their usual condition.

*Limnophilus marmoratus* Curt., *centralis* Curt., *affinis* Curt., *griseus* L., *sparsus* Curt., *auricula* Curt.

*Micropterna sequax* McLach.

*Sericostoma personatum* Spence, L. Craggie.

*Crunoecia irrorata* Curt.

*Lepidostoma hirtum* F.

*Beraea maurus* Curt.

*Molanna palpata* McLach., L. Craggie.

*Leptocerus aterrimus* Steph., L. Craggie; *L. cinereus* Curt., Loch Droma and the Kyle; *albifrons* L. and *dissimilis* Steph., Kyle.

*Mystacides azurea* L., L. Droma and the Kyle.
*Oecetis ochracea* Curt., L. Craggie and L. Droma.
*Oecetis testacea* Curt., the Kyle, common.
*Wormaldia mediana* McLach.
*Cyrnus trimaculatus* Curt.
*Tinodes waeneri* L.
*Rhyacophila dorsalis* Curt.
*Glossosoma vernale* Pict.

13 Blackford Road, Edinburgh.
*September* 19*th*, 1934.

## SYSTEMATIC NOTES UPON BRITISH AQUATIC COLEOPTERA.

BY FRANK BALFOUR-BROWNE, M.A. (OXON. ET CANTAB.), F.R.S.E., F.Z.S., F.R.E.S., P.R.M.S.
(formerly Professor of Entomology at the Imperial College of Science, London).

### PART VI. *AGABUS* AND *PLATAMBUS*.

The genus *Agabus* was created by Leach in 1817 who, having divided up the family 'Dytiscidea' into Groups and subdividing into Stirps, separated the genus from the rest of the Colymbetides, Hydaticides and Dytiscides upon somewhat trivial characters of the maxillary palpi, and upon a character of the antennae of the male which is only true of a very small section of this large genus. In defining his genus, Leach only mentions the one species, *Dytiscus serricornis* Payk., which, therefore, is the type of the genus. This species is not now in the British list, although Stephens (1828) records it from Netley, Salop, on the authority of Hope.

Commander Walker kindly examined the Hope collection in the Oxford University Museum for me and writes: 'The alleged *A. serricornis* must have disappeared long ago (if indeed it really existed in Hope's collection), and I have more than once searched without success for specimens said by Stephens and others to have been taken by Hope himself.' The record is not mentioned in Waterhouse's Catalogue (1858), nor by Fowler, and the species is not in the French or German lists; in fact it is confined to Northern Europe and Siberia. For some considerable time after Leach, authors, e.g. Curtis (1823), Sturm (1834) and others ignored the new genus and continued to use *Colymbetes* to cover the modern genera *Agabus, Platambus, Ilybius, Copelatus* and *Colymbetes*.

In 1832 Erichson took out *Ilybius* and *Copelatus*, the latter for *Dytiscus posticatus* Fab., the type, and two other American species. In 1833 Dejean, on the unpublished work of Eschscholtz, created *Rantus* and *Liopterus*, although the former, as *Rhantus*, is attributed to Lacordaire (1835) and the latter to Aubé (1836). In 1838

Hope formed the new genus *Necticus* with *Dytiscus bipustulatus* as the type. Thomson (1860) divided up the *Agabus* of Fairmaire and Laboulbène and others into *Agabus* of Leach and three new genera, *Gaurodytes, Eriglenus* and *Platambus,* the first of which is Hope's *Necticus* although, curiously enough, Hope's name seems to have disappeared from the literature until reintroduced by Des Gozis (1910—1914), who, quite correctly, uses it instead of *Gaurodytes* without, however, giving any explanation.

Sharp's work (1882) was the first really elaborate exploration of this genus, of which he made twenty-three groups, 'some of them natural and some clearly artificial' (p. 493), and he relied mainly upon five characters: (1) the coxal lines and processes, (2) the form of the anterior border of the posterior coxae and the associated form of the metasternal 'wings,' (3) the approximation of the middle legs, (4) the development of the metasternal groove, that is, the groove in that part of the metasternum which projects forward between the mid-coxae and connects with the fork of the mesosternum, and (5) the form of the prosternal process. Sharp used none of the names invented by Hope or Thomson, although his groups do not cut across those of these authors, all except six covering *Necticus* (*Gaurodytes*), five of the remainder corresponding to XIV *Eriglenus,* XV *Arctodytes* (no British species), XVII *Scythodytes,* XXI *Acathodes* (no British species), XXII *Agabus* s. str., and XXIII, now a separate genus, *Apator* of Semenov (1899).

In 1886, Seidlitz, using Thomson's genera as subgenera, broke up his *Gaurodytes* into three, the two new ones being *Scythodytes,* already mentioned, and *Xanthodytes,* on the ground that whereas in *Gaurodytes* the anterior and middle tarsi of the male possess brushes (Bürsten) with some small suckers (Saugnäpschen) interspersed, the new genera have distinct round suckers. To separate subgenera upon sexual characters cannot be regarded as sound and Des Gozis (1910-14) rejects both subgenera, as does also Guignot (1931), although his ground for so doing is that they are based upon insufficient and false characters (1933, footnote, p. 525).

In the 1931 paper, Guignot separated two other subgenera from *Gaurodytes, Asternus* with *chalconatus* as its type and only British representative, and *Agabinectes* (by a printer's error written as *Gabinectes* and corrected in 1933, p. 525) with *brunneus* Fab. and *didymus* Oliv. as the two British species. With regard to this latter subgenus it is to be noted that it definitely cuts across Sharp's arrangement, *brunneus* belonging to his Group IV while *didymus* belongs to Group IX, the only other two species, *regimbarti* Zaitz.

and *fulvipennis* Reg., being unknown to Sharp. It happens, however, that the characters distinguishing Sharp's Groups IV and IX are not fundamental and could scarcely have been used for founding subgenera, so that the question arises whether Guignot's character is sufficiently distinctive to justify the subgeneric separation from *Gaurodytes*. He finds on the underside of the first segment of the posterior tarsus in *Gaurodytes* two parallel rows of short spines, one near the external, the other near the internal margin of the segment, the latter series often abridged towards the base of the segment. We have here the admission that the inner series is often shortened in *Gaurodytes*, but examination of species reveals that the variation is much greater than this statement suggests. Whereas in some species, e.g. *guttatus, bipustulatus*, etc., the inner series, though variable, may contain numerous spines and extend more than half way along the segment, in others, e.g. *paludosus, chalconatus, zetterstedti*, etc., the inner series consists of one or two or even no spines, while other species have three or four, e.g. *abbreviatus, femoralis*, etc. This, therefore, is not a character upon which to base a subgenus, and I think that the name should be suppressed.

In my opinion *Asternus* also should be suppressed. It corresponds to Sharp's Group XIX, which he formed primarily upon the 'coxal lines in their anterior part but little directed outwards' (p. 527), but Guignot adds the statement that these lines fade out more or less completely before they reach the posterior border of the metastern and also uses the parameres of the male which, he says, differ from those of all other *Agabi* by being a single lobe sometimes only a little excised at the sides. Examination of the post-coxae of most of the British species of the genus and of some foreign ones fails to satisfy me that Sharp's character is sufficiently distinctive to justify making a sub-genus of his group, and Guignot's observation of the fading out of the suture does not carry us any farther, since the amount of fading out varies. In *chalconatus* the lines do not completely disappear, while in *neglectus* Er. and *subtilis* Er., two Continental species, they are quite distinct to the end. Passing over the objection to the use of sexual characters as subgeneric characters, a point strongly emphasised by Des Gozis in rejecting Seidlitz's subgenus *Xanthodytes*, I cannot make out any fundamental distinction between the parameres of *chalconatus, neglectus* and *subtilis*, the only species I possess of this group, and those of other *Agabi*. In the first place they are different in the three species mentioned but they are of much the same type as in all the other *Agabi*, especially the species of *Gaurodytes*, except that they are much less hairy and are narrower at the base (see Fig. 20).

We now have left the two old subgenera *Necticus* (*Gaurorytes*) and *Eriglenus*, which Thomson (1860) separated mainly upon the form of the metasternal 'wings' which he described as broad in the former and narrow in the latter. A comparison of these structures in, say, *bipustulatus* and *abbreviatus*, shows a very definite difference, but if *arcticus* or *unguicularis* or *zetterstedti* Thoms. are examined they form such intermediates that the character becomes useless as a group separator. It is, however, interesting to note that species which we usually regard as closely related come together on this character, e.g. *affinis* and *unguicularis* and, again, *arcticus*, *sturmii* and *zetterstedti* have similar metasternal 'wings,' but I do not feel justified in carrying this farther.

I have tried to find some reliable character upon which to maintain these two subgenera but I have failed. An examination of the metasterna of all the British species I possess, and of several foreigners, showed that the species could be placed in two groups according to what might be called the length of the 'wings,' and at first I imagined that it would separate *Eriglenus* and *Necticus*. If a line be drawn across the metasternum from the tip of one 'wing' to that of the other it passes across the median line *behind* the middle in the following species (see Fig. 21) :—

*guttatus*.
*biguttatus*.
*paludosus*.
*brunneus*.
*affinis*.
*unguicularis*.
*didymus*.
*nebulosus*.
*conspersus*.
*arcticus*.
*sturmii*.
*chalconatus*.
*melanarius*.
*bipustulatus*.

In the following species is passes *in front* of the middle :—

*maderensis* Woll.
*uliginosus*.
*abbreviatus*.
*femoralis*.

In the following it crosses about half-way down :—

*congener*.
*zetterstedti* Thoms.

I have introduced these observations because they seem to me to indicate that the species of *Agabus* cannot be grouped into subgenera upon any character of the metasternal 'wings.' There seems to have been an independent variation going on in these structures and, of course, in the associated coxae, and authors appear to have snatched at anything which would break up the genus without having given sufficient attention to the matter. Thus, although I regret it very much, I suppress the long-standing subgenus *Eriglenus* and replace the species in *Necticus* and leave it to others to say whether the *serricornis* group are subgenerically distinct from *Necticus* or whether the latter name also must disappear, unless in the meantime I can obtain material myself.

The more I study Sharp's work upon the groups of species of the Dytiscidae, the more impressed I become with its excellence, and I regard his group arrangement of *Agabus*, followed by Fowler (1888), as still the best to use.

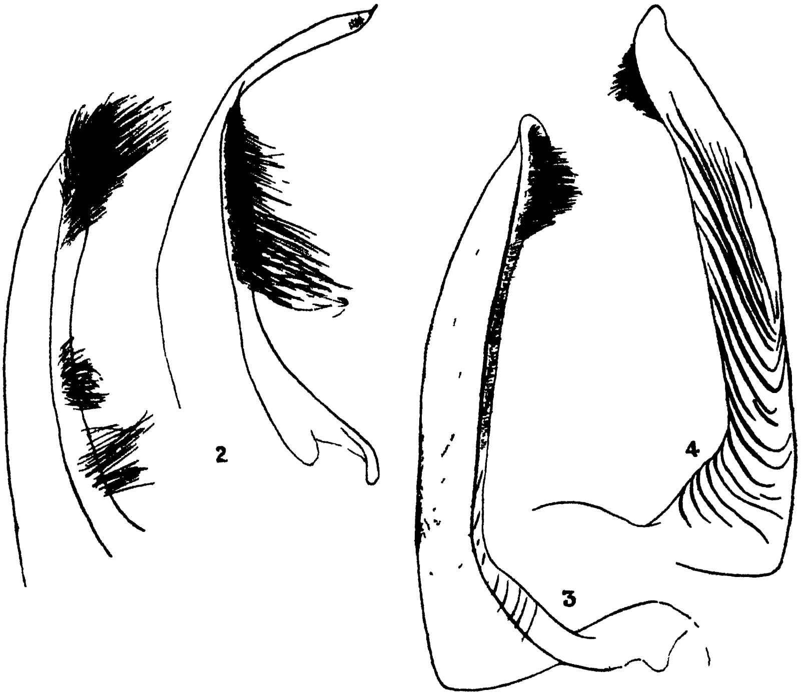

FIG. 20.—Left paramere of (1) *Agabus chalconatus* Panz., (2) *A. melanocornis* Zimm., (3) and (4) *A. subtilis* Er. (Projection drawings, all to the same scale of magnification.)

With regard to the British list as it appears in Fowler (18
it is in agreement with the Continental list except in the case of two species, *femoralis* Paykull and *abbreviatus* Fab. Although Brahm's type of his *labiatus* seems to have disappeared, the description of his species fits *femoralis*, which must therefore become a synonym. Similarly, *abbreviatus* of Fabricius is apparently *undulatus* of Schrank and, as he named the species eleven years before Fabricius, his name must stand.

It will have been noticed that I have several times mentioned *chalconatus,* although in almost every list* the name appears as '*chalconotus*' Panzer. Reference to that author shows that he took Kugelann's name for the species which he gives as '*chalconatus,*' and the error in the spelling seems to have originated with Stephens (1828). Guignot (1933, p. 535) figures a paramere of *chalconatus* and also of Zimmermann's *melanocornis,* and I was surprised to find that my drawings and microscope slides of British specimens sufficiently agreed with the figure of the latter but differed entirely with the figure of *chalconatus*. I have now examined specimens in my collection from Cornwall West, Somerset North, Norfolk East, Hants South, Dumfries, Kirkcudbright, Wigtown, Caithness, Isle of Man, Antrim, Mayo West, Channel Islands and Morocco, and all agree in the form of the paramere. Out of six spirit specimens, only two of which were males, I found one with a different type of paramere (see Fig. 20, 1) but, beyond the fact that the specimens are British, I do not know from what part of England or Scotland they came. Unfortunately the two specimens had been boiled in potash and dissected before I examined the parameres.

Reference to Zimmermann's original description of *melanocornis* (1915) and also to Guignot's shows clearly that there is no means of separating *melanocornis* from *chalconatus* except by the marked difference in the aedeagal parameres, and in my opinion such a character cannot be made the unsupported basis of specific distinction. At present I regard *chalconatus* as a species with a dimorphic male, but it is obviously necessary to acquire more information as to the distribution and range of the two forms before this can be accepted.

The British list is therefore as follows :—

*Agabus,* subg. *Necticus* Hope (1838) = *Gaurodytes* Thomson (1860).
Type of the subgenus *Dytiscus bipustulatus* Lin. named by Hope.
*guttatus* Paykull (1798).
*biguttatus* Olivier (1795) = *fontinalis* Stephens (1828).
= *nitidus* Fabricius (1801) assuming that the specimens in the general collection in the British Museum are correctly named.

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* Zimmermann 1917 (1919) has the correct spelling.

*paludosus* Fabricius (1801).

. . . . . . .

*brunneus* Fabricius (1798).

. . . . . . .

*uliginosus* Linneus (1761).

. . . . . . .

*affinis* Paykull (1798).
*unguicularis* Thomson (1867).

. . . . . . .

*didymus* Olivier (1795).

. . . . . . .

*congener* Thunberg (1794) and Paykull (1798).
*nebulosus* Forster (1771).
*conspersus* Marsham (1802).
*striolatus* Gyllenhal (1808).

. . . . . . .

*labiatus* Brahm (1790) = *femoralis* Payk. (1798).
*undulatus* Schrank (1776) = *abbreviatus* Fabricius (1787).

. . . . . . .

*arcticus* Paykull (1798).
*sturmii* Gyllenhal (1808).

. . . .

*chalconatus* Panzer (1796) = *chalconotus* auct. = *melanocornis* Zimmermann (1915).

. . .

*melanarius* Aubé (1836).
*bipustulatus* Linn. (1767).

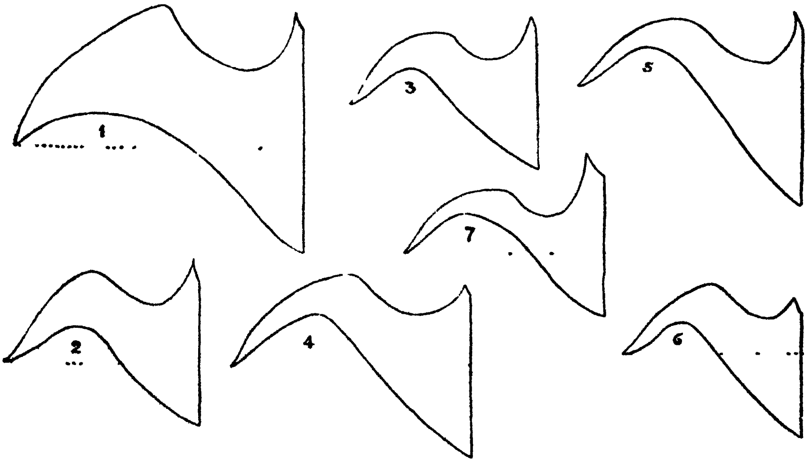

FIG. 21.—Left half of metasternum of (1) *Agabus bipustulatus* Lin., (2) *A. arcticus* Payk., (3) *A. unguicularis* Thoms., (4) *A. zetterstedti* Thoms., (5) *A. undulatus* Schr., (6) *A. labiatus* Brahm., (7) *Platambus maculatus* Lin. (Projection drawings, all to the same scale of magnification.)

*Platambus*, one of Thomson's genera which he separated mainly upon four characters, the narrow smoothly-curved metasternal 'wings' (see Fig. 21-7), the broad, 'rhomboid' prosternal process, the long broad elytral epipleura and the long trochanters of the posterior legs. These four characters, taken together, seem to me to amply justify this genus, but Sharp (1882) relied only upon the epipleura. Des Gozis (1910-14) reduces the genus to a subgenus but no one has followed him.

*Dytiscus maculatus* Linneus (1758), the only British species of a small genus, was made the genotype by Thomson (1860).

Winscombe Court, Winscombe, Somerset.
*October 24th*, 1934.

## A NEW GENERIC NAME IN THE PROTONEURIDAE (ODONATA).

### BY J. COWLEY, M.A., F.R.E.S.

In the paper (1934 c) in which I dealt with the nomenclature of the *Disparoneura*-complex, the genus *Disparoneura* Selys (1886)—Kirby (1890) was unfortunately overlooked. (I use the word complex here with the meaning of a group of genera involved with each other in nomenclature, not necessarily in taxonomy.) I thereford propose the following new name :

**Elattoneura** nom. nov., TYPE *Disparoneura glauca* Selys (1860) (*nec Agrion glaucum* Burmeister (1839)), for *Disparoneura* Selys (1886)—Kirby (1890), preoccupied by *Disparoneura* Selys (1860).

I have already shown (1934 c) that Selys (1865) fixed *Argia quadrimaculata* Rambur (1842) as the type of *Disparoneura* Selys (1860). In 1886 Selys divided *Disparoneura* into three groups, with *subnodalis*, *glauca* and *gomphoides* as types ; Kirby (1890) selected *glauca* as the type of *Disparoneura*, and the genus since known under that name is now considered distinct from *quadrimaculata*. *Disparoneura* Selys (1886) — Kirby (1890) and of modern authors should therefore have been given a new name, which I have supplied above. The new generic name is derived from *ἐλαττων*, smaller, with reference to the reduced condition of the vein $A'$. There can be no confusion with *Elassoneuria* in Ephemeroptera.

It should be pointed out that Selys erroneously identified his species as *Agrion glaucum* Burm., which latter has since been shown to be an *Enallagma* ; Selys' name is therefore not preoccupied by Burmeister's, since they were at the time of their description placed in different genera.

The old genera *Caconeura* (now *Prodasineura*) and *Disparo-*

*neura* (now *Elattoneura*) were frequently confused, and *Caconeura* was often used for species now placed in *Notoneura*. I propose giving a summary of the characters of the genera of the *Disparoneura*-complex, with a list of species, in a later paper; here I give the diagnostic characters of *Prodasineura* and *Elattoneura*. The vein-notation used is that of Tillyard (1926).

Characters common to the two genera: Odonata Zygoptera with two antenodals; wings petioled; no supplementary longitudinal veins between the main veins; $IR_3$ arising at the subnodus; $R_{4+5}$ arising less than a cell-length before the subnodus; quadrangle rectangular in shape, never crossed, elongated in the proximo-distal axis of the wing; the cross-veins arranged to form a series of transversals; $Cu_2$ reduced; $1A$ absent; $A'$ reduced or absent, never continuing as the vein $1A$ beyond the cross-vein (*ma*) descending from the postero-distal angle of *q* to the wing-margin; no extra cross-vein basal to *ac* in the cubital space; labium with short lobes; *ac* about midway between the first and second antenodals, never before or at the level of the first antenodal; posterior lobe of prothorax of female armed with one or two pairs of strongly curved hooks; wings hyaline, without conspicuous bars of colour.

*Elattoneura*: $A'$ always present, arising at or before *ac* and ending in *ma*, so that approximately it is parallel to the posterior side of *q* and bisects the space between *q* and the wing-margin.

*Prodasineura*: $A'$ present or absent; when present arising at or before *ac* and ending in the wing-margin at varying distances from *ac*, but never ending in or reaching the level of *ma*.

*Sympecma* Burmeister (1839). A correction must be made to my notes in this Magazine (1934 e): the name *Sympecma* was first published by Burmeister (1839) from an MS. name of Charpentier; although Burmeister did not use it as a generic name, it should be dated from Burmeister (1839).

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59 Hills Road, Cambridge.
*November 5th, 1934.*

# A STABLE NOMENCLATURE?

BY G. V. HUDSON, F.R.E.S., F.N.Z. INST.

About the year 1880, when I was a schoolboy collector in England, South's 'Synonymic List of British Lepidoptera' first appeared and created a great stir amongst the entomologists of the day. Much indignation was expressed in many quarters at the changes of nomenclature involved, and the Haggerston Entomological even went so far as to pass a resolution condemning the list and asking for a re-issue of the 'Doubleday' list, which had been in general use up to that time. The new list was, however, eventually adopted in the hope that the alterations then made would be permanent, and a stable nomenclature would result. That was over fifty years ago, and how far the hopes then entertained have failed in realisation is well known to all. Now we have a much more ambitious scheme, this time launched by the Royal Entomological Society of London for the revision of all the generic names (and incidentally also the specific names?) of British insects, that portion relating to the British Butterflies having been issued in February last. Judging from what has appeared, an enormous amount of work will be involved in this production, as well as considerable expense in the printing; and from the experience of the past one cannot help wondering whether it is all worth while.* Taking the British Butterflies alone, there has been a great number of troublesome alterations during the past fifty years, and yet in this new list further amendments are proposed, presumably yet another effort to attain the long-hoped-for stable nomenclature!

In this matter of nomenclature it seems to me that we have much to learn from the popular names of our British Butterflies. These names have been given and maintained on the basis of very ordinary common sense, and have not been regulated by rules set up by commissions, committees or conventions; nevertheless they have enjoyed a permanence which has completely failed to eventuate so far as the scientific names are concerned. The questions which appear to me worthy of consideration by entomologists who desire to be *naturalists,* and not merely lawyers, are as follows:—

(1) Whether it has not been a mistake to regard the law of priority as a fetish which must of necessity override common sense and convenience. Would not the observance of general usage have been preferable in most cases?

(2) Is it justifiable to throw on the scrap-heap, so to speak, hundreds of standard works on the Natural History of Insects throughout the world merely to satisfy the desire for the mainten-

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* When this work is completed we shall know no more about the insects *themselves* than we do at present. It solely relates to *names* and *literature.*

ance of the law of priority? This has practically been done by the constant changes of nomenclature made during the past fifty years, and more especially during the last twenty-five years, since International Committees have acquired such great powers of interference in entomological matters.

(3) Would it not be time enough to think of a uniform International Entomological Nomenclature when we have a universal language? Of what use is it to me, for instance, when I cannot understand German or Russian to know just the *names* of the insects mentioned in works of those languages? In the meantime could we not very well decide these questions on our own responsibility, and let the other countries fall in with us or stand out as they think fit? This would certainly be better than continually destroying the utility of our own work by invalidating the names used for the insects mentioned in our standard literature.

(4) Finally, there is another aspect of the question which I do not remember having seen mentioned before — this is the disturbances caused in the sister sciences by these frequent alterations in nomenclature. For example, in New Zealand quite a number of insects bear the specific name '*sophorae*.' Now the botanical name '*Sophora*' has recently been changed to '*Edwardsia*,' and these very appropriate and instructive names become meaningless. Numerous other similar cases could of course be cited.

In conclusion, it is, I think, self-evident to everyone that the continual alteration of nomenclature is an obstruction, not a help to the study of Natural History. At the present time there is unquestionably a tendency to exaggerate the importance of the so-called legal aspect of entomology. It seems to me, for example, a much greater thing to have discovered the wonderful life-history of the Large Blue, as recounted in Mr. Frohawk's beautiful book, than to find out when that butterfly was first called '*Arion*' and who gave it that name! It is very difficult to suggest a way out of the manifold difficulties, which have been largely created by those entomologists who regard the legal aspect of the science as of paramount importance, but apparently a reversion to a general usage of names of, say, fifty years' standing is the only practical and commonsense solution. As an example it would certainly greatly simplify matters if the nomenclature given in Meyrick's Revised Handbook of British Lepidoptera were generally adopted at the present time.

Hillview, Karori, Wellington, N.Z.
*September 15th, 1934.*

*Dryocoetes autographus* Ratz. *in Shropshire.*—This rare bark-beetle has turned up in abundance in the Oswestry district, some hundreds of examples having been taken from a fallen spruce-fir near Gobowen and smaller numbers near the old racecourse. In the Gobowen case the tree is a solitary one and can only be a temporary home of the insect; its established habitat is probably that near the old racecourse, where there is a continuous and ample supply of suitable food. In its habitats the beetle resembles *D. villosus*, the larvae eating galleries in the bark; the perfect insect also appears to feed on the bark, passing most of its existence and wintering therein.

I shall be pleased to supply specimens of this beetle (unmounted) to any Coleopterist, on receipt of a tube, as long as my supply lasts.—J. HIGNETT, 8 Oak Street, Oswestry, Salop: *December 16th,* 1934.

*Water-beetles as food for fish.*—I am away from entomological literature, and so open to correction, but I cannot remember seeing anywhere in print any account of the insect-food of fish that mentioned particular species of water-beetles. I am quite aware that much has been written on the flies, etc., devoured by freshwater fish. Through the kindness of Mr. J. L. Joyce, F.R.C.S., of Reading, a keen angler, I recently received the beetle-contents of the stomach of a Grayling (*Thymallus vulgaris*), caught by him last June in the River Lambourne near Bagnor, Berks. Amongst various unidentifiable coleopterous remains were one *Haliplus wehnckei* Gerh., one *H. lineatocollis* Marsh., two *Hydroporus rivalis* Gyll., and one *Helophorus brevipalpis* Bed., in good condition. Professor F. Balfour-Browne has seen the specimens. I thought it was worth while putting this on record.—E. J. PEARCE, Breadsall Mount, near Derby: *December 4th,* 1934.

*Elater tristis* L. *in Scotland.*—With reference to Mr. Walker's note on the record of the capture of *Elater tristis* by Mr. Ashe at Nethy Bridge, in the November number of this Magazine, I may mention that during July, 1914, I found a single specimen at Rannoch, resting upon a log of Scots fir in the sawpit at Dall, and a record of this capture appeared in the 'Scottish Naturalist' (1918, p. 142). Weaver's original discovery of the beetle in Scotland appears to have been made about the year 1852 (Proc. Ent. Soc. Lond., May 2nd, 1853; Zoologist, 1853, p. 3921) and, according to the Appendix to Murray's 'Catalogue of the Coleoptera of Scotland' (p. 135), it was found by him in the 'Black forest, Rannoch.'—A. FERGUSSON, Grangemount, Dunfermline, Fife, N.B.: *November 12th,* 1934.

*Dytiscus dimidiatus* Bergstr. *in Norfolk.*—Following up the recording of this species from South Wales, it may be of interest to add that I collected a number of specimens at the end of August this year in the neighbourhood of Barton Turf, Norfolk. Both males and females occurred in the peaty areas, and were taken by means of a water-net, together with *D. marginalis* L., *D. punctulatus* F. and large numbers of the water-bug *Ranatra linearis* L.

I can further verify the record from the peat bog areas near Glastonbury, Som., as I have taken several examples of both sexes there during the past two years.—GERALD A. WALTON, 34 Northumberland Road, Redland, Bristol 6: *November 22nd,* 1934.

# Societies.

**Entomological Club.**—A meeting of the Entomological Club was held at the Museum, Tring Park, on September 29th, 1934, Lord Rothschild in the Chair.

Members present in addition to the Chairman: Mr. Horace Donisthorpe, Mr. H. Willoughby Ellis, Mr. Jas. E. Collin, Mr. W. J. Kaye. Visitors present: Major E. E. Austen, Mr. H. E. Andrewes, Dr. K. G. Blair, Mr. E. C. Bedwell, Dr. Malcolm Burr, Prof. G. D. Hale Carpenter, Dr. E. A. Cockayne, Mr. C. L. Collenette, Mr. Guy Dollman, Dr. F. A. Dixey, Mr. H. M. Edelsten, Mr. S. S. Flower, Mr. J. C. F. Fryer, Mr. F. W. Frohawk, Major Philip Graves, Capt. Francis Hemming, Mr. H. R. Hewer, Dr. Karl Jordan, Mr. W. H. Laing, Sir Guy A. K. Marshall, Mr. William E. F. Nelson, Dr. S. A. Neave, Mr. Louis B. Prout, Mr. W. P. Pycraft, Dr. C. Tate Regan, Capt. N. D. Riley, Mr. W. Rait-Smith, Mr. H. Stevens, Mr. C. Danes Sherborn, Mr. Henry J. Turner, Mr. W. H. T. Tams, Mr. B. P. Uvarov, Mr. Colbran J. Wainwright, Mr. C. G. M. de Worms, Comm. J. J. Walker.

The members and guests arrived at the Museum at various times during the morning and were received by Lord Rothschild. The whole of the collections in the Museum were thrown open to visitors, and the Chairman made special exhibits on the tables in the Insect Rooms and the former Bird Room.

(1) The entire collection of the Acraeinae, a subfamily of Nymphalidae, which is purely tropical and subtropical, the large majority of species occurring in Africa south of the Sahara, a fairly large number in South and Central America, and a few species in the Oriental Region as far east as the Solomon Islands, none being found in the Palaearctic and Nearctic Regions proper. The specimens of each species and subspecies were arranged strictly according to localities, the collection thus showing which districts were sparsely represented and at the same time illustrating the extent of the variability of a species in any locality from which the collection contained an adequate series.

(2) Some *Papilios* and *Pseudacraeas* resembling *Planema* and *Acraea*.

(3) *Acraeas* collected in South-West Africa and Angola by Dr. Karl Jordan in 1933 and 1934, among them a series of *Acraea hypoleuca* Westw., of which only one specimen was known (in the Hope Department, Oxford).

(4) A large series of the Uraniid *Chrysiridia madagascariensis*, with some very conspicuous aberrations in which the metallic green scaling of the forewing was much extended, forming a large patch divided distally into broad rays on the veins.

(5) The larva and imago of *Goliathus cacicus* from Sierra Leone, the larva measuring five and a half inches in length.

(6) The cast of the Giant Salamander which has been living in a tank at Tring Park for forty-four years, and has only lately died.

Luncheon was served at one o'clock and a most pleasant time was spent, the guests thoroughly enjoying the conversation round the tables. The whole of the party again returned to the Museum, and left for their various destinations later in the afternoon, after a most interesting and successful day.—H. Willoughby Ellis, *Hon. Secretary*.

**The Royal Entomological Society of London**: *Wednesday, October 17th, 1934.*—Dr. S. A. Neave, O.B.E., President, in the Chair.

The following were elected Fellows of the Society: Captain Robert Alured Denne, Junior Naval and Military Club, 96 Piccadilly, W.1; S. S. Malik, Kashmir Forest Service, Srinigar, Kashmir, India; Nellie Freebairn Paterson, Department of Zoology, University of the Witwatersrand, Johannesburg, S. Africa; E. Graywood Smyth, Hacienda Cartavio, Trujillo, Peru, S. America; Sir Thomas Stanton, K.C.M.G., Colonial Office, Downing Street, S.W.1; C. B. Symes, Medical Research Laboratory, P.O. Box 41, Nairobi, Kenya Colony.

The death of Mr. M. L. Thompson, elected a Fellow in 1901, was announced.

Professor E. B. Poulton, F.R.S., on behalf of Colonel C. H. Evans, presented a bronze plaque of J. H. Fabre, an Honorary Fellow of the Society from 1901 to 1915.

Mr. H. St. J. K. Donisthorpe exhibited a beetle new to Britain and a butterfly from Windsor Forest. Professor P. A. Buxton, on behalf on Mr. D. J. Lewis, made a communication on the movements of the ptilinum in newly-emerged Tsetse Flies. Dr. O. W. Richards discussed the number of generations of *Pieris rapae*, illustrating his remarks with the epidiascope. Professor G. D. Hale Carpenter exhibited and discussed (1) further examples of beak-marked butterflies from the Solomon Islands, and (2) a collection of butterflies of one type of colour pattern from Mount Mlanje, Nyasaland, including a little-known species. Professor Poulton exhibited (1) a homing British moth, *M. anceps*; (2) bees with Orchid pollinia collected by Colonel G. H. Evans at Valescure and in Jersey; (3) on behalf of Dr. J. G. Myers, a photograph of a New Zealand leaf-hopper on its food plant, the Jointed Rush; (4) on behalf of Mr. J. Collins, caterpillars accepted and refused by larvae of the Pentatomid bug *Picromerus bidens* L.; (5) on behalf of Dr. Frank Morton Jones, observations and experiments on insects eaten by birds in 1934; and (6) on behalf of Dr. J. G. Myers, notes on *Laternaria*. Dr. H. Eltringham, F.R.S., gave an account of the brush organs in *Lithosia griseola*, illustrated by the epidiascope. Mr. R. B. Benson exhibited some photographs of the female Australian sawfly *Perga lewisi* Westwood protecting its larvae and of a larval nest of the South American sawfly *Dielocerus formosus* Klug. Miss C. E. Longfield made some observations on the habits of Lepidoptera in East and Central Africa, including attacks by enemies, courtship and resting and flying positions.

*Wednesday, November 7th,* 1934.—DR. S. A. NEAVE, O.B.E., President, in the Chair.

The following were elected Fellows of the Society: Dr. Alfred Ernest Cameron, 8 West Savile Road, Edinburgh; Thomas Wallace Chorley, The Agricultural Laboratory, Kampala, Uganda; Walter Dannatt, 94 Guibal Road, Lee, S.E.12; Dr. R. U. Hungorani, M.B., B.S., L.M., 8 Harley Street, W.1; Edward A. Lee, 60 Dawnay Road, Wandsworth Common, S.W.18.

The death of Mr. A. H. Martineau, elected a Fellow in 1897, was announced.

Mrs. M. J. Richards exhibited some butterflies attracted to dung, sweat and water. Professor G. D. Hale Carpenter exhibited and discussed (1) Dipterous mimics and parasites of the honey bee in Uganda, by T. W. Chorley; (2) some little-known butterflies collected by Captain I. G. Owen on the Sudan-French Congo border; and (3) further examples of attacks of birds on butterflies. Professor E. B. Poulton, F.R.S., exhibited and discussed (1) on behalf of Mrs. M. D. Brindley, notes on ant-like British Hemiptera; (2) on behalf of Dr. J. G. Myers, spiders and the bee-like fly *Eristalis*; (3) on behalf of Colonel H. D. Peile, a N.W. Himalayan moth mimicking a butterfly, also a procryptic moth and Hemipterous (Pentatomid) larva; (4) on behalf of Dr. R. A. Fisher, F.R.S., a North American 'Viceroy' (*Basilarchia*) mimic confused with the 'Monarch' (*Danaus plexippus*) model; (5) on behalf of Dr. J. G. Myers, a British Guiana bee and an Asilid fly mimic, a Braconid and a Reduviid bug mimic, and a North American Indian folk-tale on a bird-wasp association. The Rev. A. Miles Moss exhibited specimens of *Dynastor macrosiris* and discussed its early stages, life history and food plants. Mr. A. Musgrave gave a talk on Australian entomology, illustrated by lantern slides.

The following papers were read: 'The genital sterna of the immature stages of *Rhodnius prolixus* (Hem.),' by J. D. Gillett; 'On the brush organs of the male *Lithosia griseola* Hb.,' by H. Eltringham; 'Nesting associations of birds with social insects,' by J. G. Myers; 'High Mountain Sawflies of Britain,' by R. B. Benson; 'The early stages of *Minoa murinata* Scop., with a description of the verrucae of the larva,' by E. A. Cockayne; 'A revision of the African Telenominae,' by G. E. J. Nixon (communicated by N. D. Riley).—A. W. McKenny-Hughes, *Hon. Secretary.*

# THE BRITISH FUNGICOLOUS COLEOPTERA.

BY HORACE DONISTHORPE, F.Z.S., F.R.E.S.

(Department of Entomology, British Museum, Natural History).

When Coleoptera are recorded as having been taken in fungi, one generally reads: 'in fungi,' 'in agarics,' 'in powdery fungi on stumps,' or 'in boleti,' this last being usually quite incorrect.

The present paper is an attempt to fix the proper names of the fungi to which beetles are attached, or in which they have been found.

For years past I have brought home the fungi in which I have taken beetles in order to get them named, and I think the result makes a satisfactory preliminary list.

I am much indebted to my friend Mr. J. Ramsbottom, Keeper of the Botanical Department, British Museum, for kind help in naming fungi for me.

The English names as far as I know them are attached to as many species as possible, though I understand that these names are not favoured by the highest authorities on fungi!

## I. List of the true British Fungicolous Beetles.

*Oxypoda alternans* Grav.
*Atheta liturata* Steph.
*Autalia impressa* Ol.
*Gyrophaena pulchella* Heer.
,, *affinis* Mann.
,, *poweri* Crotch.
,, *gentilis* Er.
,, *nana* Payk.
,, *fasciata* Marsh.
,, *bihamata* Thoms.
,, *minima* Er.
,, *laevipennis* Kr.
*Gyrophaena lucidula* Er.
,, *manca* Er.
,, *strictula* Er.
,, *convexicollis* Joy.
*Agaricochara laevicollis* Kr.
*Bolitochara lucida* Gr.
,, *lunulata* Payk.
,, *bella* Märk.
,, *obliqua* Er.
,, *reyi* Sharp.
,, *mulsanti* Sharp.*
*Oligota granaria* Er.

*Bolitobius lunulatus* L.
,, *trinotatus* Er.
,, *exoletus* Er.
,, *pygmaeus* F.
*Oxyporus rufus* L.
*Homalium nigrum* Gr.
*Proteinus atomarius* Er.
*Megarthrus hemipterus* Ill.
*Agathidium confusum* Bris.
,, *seminulum* L.
,, *rhinoceros* Schrank.
,, *reitteri* Gangl.
*Anisotoma humeralis* F.
,, *castanea* Hbst.
,, *orbicularis* Hbst.
*Liodes cinnamomea* Panz. (Most probably all the species of *Liodes*, and the small allied genera taken by evening sweeping, as also *Thalycra sericea* Strm. and *Odontaeus mobilicornis* F.,* live in underground truffles.)
*Lycoperdina bovistae* F.
,, *succincta* L.
*Endomychus coccineus* L.
*Dacne humeralis* F.
,, *rufifrons* F.
*Triplax russica* L.
,, *aenea* Schall.
,, *bicolor* Gyll.
,, *lacordairei* Crotch.
*Cyrtotriplax bipustulata* F.
*Cicones variegatus* Hellw.
*Epuraea distincta* Grimm.
*Omosiphora limbata* F.
*Pocadius ferrugineus* F.
*Cychramus fungicola* Heer.
*Thymalus limbatus* F.
*Enicmus testaceus* Steph.
,, *consimilis* Mann.*
,, *fungicola* Th.*
*Diphyllus lunatus* F.
*Diplocoelus fagi* Guer.
*Cryptophagus lycoperdi* Hbst.
,, *ruficornis* Steph.
,, *dentatus* Hbst., ab. *major* Donis.
*Atomaria fimetarii* Hbst.
*Triphyllus suturalis* F.
*Triphyllus punctatus* F.
*Mycetophagus 4-pustulatus* L.
,, *piceus* F.
,, *atomarius* F.
,, *multipunctatus* Hellw.
,, *fulvicollis* F.*
*Aspidiphorus orbiculatus* Gyll.
*Coenocara bovistae* Hoff.
,, *subglobosa* Muls.
*Dorcatoma dresdensis* Hbst.
,, *serra* Pz.
,, *punctulata* Muls.
*Sphindus dubius* Gyll.
*Cis boleti* Scop.
,, *villosulus* Marsh.
,, *micans* F.
,, *hispidus* Pk.
,, *bidentatus* Ol.
,, *alni* Gyll.
,, *nitidus* Hbst.
,, *jacquemarti* Mell.
,, *lineatocribratus* Mell.
,, *elongatulus* Gyll.
,, *pygmaeus* Marsh.
,, *rhododactylus* Marsh.
,, *festivus* Pz.
,, *vestitus* Mell.
,, *fuscatus* Mell.
,, *bilamellatus* Wood.
,, *coluber* Ab.
,, *latifrons* Pool.
,, *4-dentulus* Perris.
*Rhopalodontus perforatus* Gyll.*
,, *fronticornis* Pz.
*Ennearthron affine* Gyll.
,, *cornutum* Gyll.
*Octotemnus glabriculus* Gyll.
*Bolitophagus reticulatus* L.
*Heledona agaricola* F.
*Diaperis boleti* L.*
*Pentaphyllus testaceus* Hell.*
*Tetratoma fungorum* F.
,, *ancora* F.
*Orchesia micans* Pz.
*Clinocara undulata* Kr.
*Hallomenus humeralis* Pz.
*Abdera flexuosa* Pk.
*Zilora ferruginea* Pk.
*Platyrrhinus latirostris* F.

**I have taken all the above species in fungi in Britain except those marked with an asterisk.**

II. A LIST OF THE ABOVE-NAMED BEETLES. THE NAME OF THE FUNGUS IN WHICH THEY WERE TAKEN IS KNOWN TO MYSELF OR TO OTHER WRITERS.

*Oxypoda alternans* Gr., frequently occurs in *Polyporus intybaceus* Fr. ('Cock of the Woods') and *P. betulinus* Fr. ('Birch Bracket'), also in other fungi.

*Atheta liturata* Steph., in fungi (Fowler; Blatch). I have taken it in *Polyporus squamosus* Fr. ('Dryad's Saddle').

*Autalia impressa* Ol. I have taken it in *Polyporus squamosus* Fr. and *Armillaria mellea* Quél ('Honey Tuft'; 'Honey-coloured Toadstool').

*Gyrophaena pulchella* Heer. I found it in some numbers in *Hypholoma fasciculare* Quél ('Sulphur Tuft') in Windsor Forest.

*G. affinis* Mann., in *Hypholoma fasciculare*; also in many other fungi.

*G. poweri* Crotch, in *Hypholoma fasciculare.*

*G. gentilis* Er., in *Hypholoma fasciculare, Pleurotus ulmarius* Quél ('Oyster Fungus'), etc.

*G. nana* Pk., in *Armillaria mellea* Quél, *Hypholoma fasiculare* Quél, and other fungi.

*G. fasciata* Marsh., in *Pholiota spectabilis* Fr. ('Notable Scalycap'), etc.

*G. minima* Er., in *Hypholoma fasciculare,* etc.

*G. laevipennis* Kr., in *Hypholoma fasciculare, H. hydrophilum* Quél., *Lactarius turpis* Fr. ('Base Toadstool'), and other fungi.

*G. bihamata* Th., in *Hypholoma fasciculare, Pheurotus ulmarius,* etc.

*G. lucidula* Er., in some numbers in *Lentinus tigrinus* Fr., on willow-stumps.

*G. strictula* Er., is always to be found in *Daedalea quercina* Pers. I have also taken it in *Polystictus versicolor* Fr. ('Variable Polystictus'), *Hypholoma fasciculare,* and *Pleurotus ulmarius.*

*G. convexicollis* Joy. I took it in some numbers in *Lentinus tigrinus,* on willow-stumps.

*Agaricochara laevicollis* Kr. I have taken it in *Polystictus versicolor, Trametes rubescens* Fr. and *Polyporus betulinus* ('Razor Strop Fungus,' 'Birch Bracket').

*Bolitochara bella* Märk., in *Collybia fuscipes* Bull ('Spindle Stem') and *Pleurotus ulmarius.*

*Oligota granaria* Er., lives in cellars, etc., on the black mould *Racodium cellare* Bisch (cellar fungus), which grows on the walls, etc. I once took it in some numbers in a cellar in a granary in High Holborn.

*Bolitobius atricapillus* F., in *Pleurotus ulmarius*, etc.

*B. pygmaeus* F., in *Polyporus intybaceus*, etc.

*B. trinotatus* Er., in *Armillaria mellea* and *Polyporus sulphureus* Fr. ('Sulphur Bracket').

*Oxyporus rufus* L., once in *Pholiota spectabilis* in Windsor Forest. On September 12th, 1891, when in company with my friend Mr. R. W. Lloyd, this fine beetle was found in agarics (eating passages through the gills) at Oxshott. I have only once found it since; a single specimen on June 26th, 1930, in Windsor Forest as recorded above.

*Homalium nigrum* Gr. I have taken it in *Polyporus intybaceus*; also in rotten fungi.

*Proteinus atomarius* Er., in *Hypholoma fasciculare* and *Armillaria mellea*. Often in very putrid fungi.

*Megarthrus hemipterus* Ill., in *Pleurotus ostreatus* Quél. (the 'Oyster Mushroom'), *P. sapidus* Sacc. ('Savoury Oyster'), *Fistulina hepatica* Fr. ('Poor Man's Beef,' 'Beefsteak'), etc.

*Agathidium seminulum* L., in *Reticularia lycoperdon* Bull. When beetles are recorded 'in powdery fungus' on old logs, etc., it generally refers to this fungus, but it may also apply to the other species, *Fuligo septica* Gmelin ('Flowers of Pan').

*A. confusum* Bris., in *Reticularia lycoperdon.*

*A. reitteri* Ganglb., in *Reticularia lycoperdon.*

*A. rhinoceros* Sharp, in *Reticularia lycoperdon.*

*Anisotoma humeralis* F., usually occurs in *Reticularia lycoperdon.* I have also taken it in *Hirneola auricula-judae* Berk. ('Jew's Ear').

*A. castanea* Hbst., in *Reticularia lycoperdon.*

*A. orbicularis* Hbst., in *Reticularia lycoperdon.*

*Liodes cinnamonea* Pz., in *Tuber aestivum* Vitt. (the Truffle).

*Lycoperdina bovistae* F., in *Lycoperdon gemmatum* Bats. (Puff ball). Fowler gives *Lycoperdon bovista* L.; this is the 'Giant Puff Ball,' and I have never known it to occur in that species.

*L. succincta* L., in *Lycoperdon gemmatum.*

*Endomychus coccineus* L., the beetle and its larva feed on *Auricularia mesenterica* Pers., under beech bark, in faggots, etc.

*Dacne humeralis* F. I have taken it in *Pleurotus ostreatus, P. sapidus, P. ulmarius, Polyporus betulinus, P. sulphureus, P. squamosus,* and *Panus tortulosus* Fr. ('Hairy Panus').

*D. rufifrons* F., in *Pleurotus sapidus, Polyporus squamosus* and *P. betulinus.*

*Triplax russica* L., sometimes abundant in *Polyporus squamosus*.

*T. aenea* Schall. I have found it in the New Forest, at Gibside, Durham, and plentifully in the Forest of Dean in fungus on holly trees; unfortunately I do not know the name of the fungus.

*T. lacordairei* Crotch. I took it in plenty in *Pleurotus enosmus* Lacc. (' Tarragon Oyster ') in Darenth Wood.

*Cicones variegatus* Hellw. Its regular habitat is in *Ustulina vulgaris* Tul., in hollow beech trees. I have also taken it in *Hypoxylon fuscum* Fr.

*Omosiphora limbata* Pk., in *Lentinus tigrinus*.

*Pocadius ferrugineus* F. Its usual habitat is *Lycoperdon bovista*. I have also taken it in *Polyporus squamosus, P. dryadeus* Fr. (' The Dryad '), and *Lycoperdon gemmatum*.

*Thymalus limbatus* F., in *Polyporus betulinus*; once in *Reticularia lycoperdon*.

*Diphyllus lunatus* F., is confined to *Daldinia concentrica* Ces. and De Nat.

*Enicmus testaceus* Steph., in *Reticularia lycoperdon*.

*E. consimilis* Mann., in *Polyporus betulinus*.

*E. fungicola* Th., in *Reticularia lycoperdon*.

*Diplocoelus fagi* Guer. Its usual habitat is *Hypoxylon fuscum*. I once took it in *Fomes fomentarius* Karst (' Tinder Bracket,' ' Amadou ').

*Cryptophagus lycoperdi* Hbst. Its regular habitat is in *Scleroderma vulgare* Horner (' Common Earth-ball '). Mr. E. H. Ellis, of the Botanical Department, British Museum, gave me a bit of an underground truffle, *Choiromyces meandrniformis* Vi Hadini, which had two of this beetle in it. He dug up the truffle at Cutmill Common, Surrey.

*C. ruficornis* Steph., confined to *Daldinia concentrica*.

*C. dentatus* Hbst. ab. *major* Donis., in *Polyporus sulphureus, P. betulinus, P. squamosus*, and rotten agarics.

*Atomaria fimetarii* Hbst. I took it in numbers in *Coprinus atramentarius* Fr. (' Inky Toadstool '). Fowler gives *Coprinus comatus* Fr. (' The Lawyer's Wig ').

*Triphyllus suturalis* F. I have taken it in *Fistulina hepatica, Pleurotus sapidus, Polyporus squamosus*, and *Phallus impudicus* Pers. (' Stink Horn fungus ').

*Triphyllus punctatus* F. It is specially attached to *Fistulina hepatica*; I have also taken it in *Pleurotus sapidus, P. ulmarius, Polyporus squamosus, Pholiota spectabilis*, and *Phallus impudicus*.

*Mycetophagus 4-pustulatus* L., abundant in *Polyporus squamosus*; I have also taken it in *Pleurotus ostreatus, P. ulmarius, P. sapidus, Hypholoma hydrophilum, Collybia fuscipes* Bull., etc.

*M. piceus* F., in *Polyporus sulphureus, P. squamosus, Fistulina hepatica*, etc.

*M. atomarius* F., in *Pleurotus sapidus*; in some numbers in *Daldinia concentrica.*

*M. multipunctatus* Hellw., sometimes in numbers in *Polyporus squamosus*; also in *Pholiota spectabilis, Phallus impudicus*, etc.

*Aspidiphorus orbicularis* Gyll., in *Reticularia lycoperdon.*

*Caenocara bovistae* Hoff., in *Lycoperdon gemmatum* and *Bovista plumbea.* Fowler also gives *Lycoperdon bovista.*

*Coenocara subglobosa* Muls., in *Lycoperdon gemmatum.*

*Dorcatoma dresdensis* Hbst., bred in some numbers from *Fomes fomentarius.*

*D. serra* Pz., bred in numbers from *Polyporus dryadeus*, and also *Fomes fomentarius.*

*Sphindus dubius* Gyll., always in *Reticularia lycoperdon*; probably also in *Fuligo septica.*

*Cis boleti* Scop., in *Trametes gibbosa* and *Polystictus versicolor.*

*C. villosulus* Marsh., in the same.

*C. hispidus* Pk., in *Trametes gibbosa.*

*C. bidentatus* Ol., in *Trametes gibbosa, Polyporus sulphureus, P. betulinus*, and *Fomes ulmarius* Ckc. (' Elm Bracket ').

*C. nitidus* Hbst., in *Fomes fomentarius, F. ulmarius*, etc.

*C. jacquemarti* Mell., in *Fomes ignarius* Karst. var. *nigricans* Karst. (' Black Touchwood Bracket ').

*C. alni* Gyll., in *Hirneola auricula-judae.*

*C. lineato-cribratus* Mell., in *F. ignarius* var. *nigricans* Karst.

*C. punctulatus* Gyll., in *Polystictus abietinus* Cooke (teste Fowler).

*C. fuscatus* Mell., in *Polyporus sulphureus, P. betulinus, P. dryadeus*, and *Fomes fomentarius.*

*C. 4-dentulus* Perris, in *Polyporus dryadeus.*

*C. bilamellatus* Wood, in great profusion in *Polyporus betulinus*; also in *Trametes gibbosa* and *Fomes fomentarius.*

*Rhopalodontus perforatus* Gyll. Fowler says that Foxcroft reared it from boleti taken from old birch trees at Rannoch. This would be *Fomes ignarius* v. *nigricans* Fr. It has not been taken again since Turner's time.

*R. fronticornis* Pz., in numbers in *Trametes gibbosa* in company with *Cis boleti*, *C. hispidus*, and *C. bidentatus*; also in *Polystictus versicolor*, *Polyporus sulphureus*, and *P. betulinus*.

*Ennearthron affine* Gyll., in *Polystictus versicolor* and *Fomes fomentarius*.

*E. cornutum* Gyll., in *Polyporus sulphureus*, *P. betulinus*, *P. squamosus*, *Fomes fomentarius*, and *F. ulmarius*.

*Octotemnus glabriculus* Gyll., in *Polystictus versicolor*, *Trametes gibbosa*, and *Polyporus betulinus*.

*Bolitophagus reticulatus* L., is confined to *Fomes ignarius* v. *nigricans*.

*Heledona agaricola* F., is confined to *Polyporus sulphureus*.

*Tetratoma fungorum* F., in *Polyporus betulinus* and *P. sulphureus*.

*T. ancora* F. I took it in numbers in company with *Cis nitidus* Hbst. in fungus on Hornbeam in Hainault Forest.

*Orchesia micans* Pz., in *Polyporus giganteus* Fr. ('Great Polypore'), *P. dryadeus*, and *Fistulina hepatica* Fr. In *Polystictus radiatus* Cooke (*teste* Fowler).

*Clinocara undulata* Kr., in *Polyporus giganteus*.

*Hallomenus humeralis* Pz., in *Polyporus sulphureus*. In *Trametes pini* Fz. (*teste* Fowler). Often under bark.

*Abdera flexuosa* Pk., in *Trametes pini* (*teste* Fowler). I took my series in a fungus on alders.

*Zilora ferruginea* Pk., in *Polystictus abietinus* (*teste* Fowler). I took my series in and under fir bark.

*Platyrrhinus resinosus* Scop. (*latirostris* F.) is confined to *Daldinia concentrica*. I bred it from the larva, which I described in 1920.

## III. LIST OF THE BEETLES TAKEN BY ME IN SOME OF THE FUNGI MOST FREQUENTED BY THEM. THE TRUE FUNGUS BEETLES ARE MARKED WITH A †.

(*a*) In *Polyporus squamosus* Fr. ('Dryad's Saddle').

***Atheta aquatica*** Th.
,, ***inoptata*** Sharp.
,, ***liturata*** Steph.†
,, ***sordida*** Marsh.
***Sipalia circellaris*** Gr.
***Autalia impressa*** Ol.†
***Leptusa fumida*** Er.
***Hypocyptus longicornis*** Pk.
***Tachinus rufipes*** L.
,, ***laticollis*** Gr. (In some numbers in Windsor Forest. More usually a northern beetle.)
***Stilicus affinis*** Er.
***Oxytelus inustus*** Gr.
***Lathrimaeum atrocephalum*** Gyll.
***Homalium excavatum*** Steph.
***Proteinus ovalis*** Steph.
***Megarthrus sinuatocollis*** Lac.
***Orthoperus mundus*** Matth.
***Sericoderus lateralis*** Gyll.
***Hister carbonarius*** Ill.
,, ***cadaverinus*** Hoff.
***Dacne humeralis*** F.†
,, ***rufifrons*** F.†
***Triplax russica*** L.†
***Pocadius ferrugineus*** F.†

*Coninomus nodifer* West.
*Cartodere elongata* Curt.
*Melanophthalma fuscula* Humm.
*Cryptophagus setulosus* Sturm.
,, *dentatus* Hbst. ab.
*major* Donis.†

*Triphyllus suturalis* F.†
,, *punctatus* F.†
*Mycetophagus* 4-*pustulatus* L.†
,, *piceus* F.†
,, *multipunctatus* Hellw.†
*Ennearthron cornutum* Gyll.†

### (*b*) In *Polyporus sulphureus* Fr. ('Sulphur Bracket').

*Cercyon lateralis* Marsh.
*Oxypoda alternans* Gr.†
*Atheta fungivora* Th.
,, *celata* Er.
*Tachinus subterraneus* L.
,, *marginellus* F.
*Bolitobius trinotatus* F.
*Quedius mesomelinus* Marsh.
,, *maurus* Sahlb.
,, *aetiolicus* Kr.
*Philonthus decorus* Gr.
*Oxytelus tetracarinatus* Block.
*Homalium rivulare* Pk.
,, *punctipenne* Th.
*Megarthrus depressus* Lac.
*Choleva nigricans* Spence.
,, *chrysomeloides* Pz.
*Dacne humeralis* F.†
*Epuraea obsoleta* F.
*Ips* 4-*guttatus* F.
*Enicmus minutus* L.

*Cartodere elongata* Curt.
*Coninomus nodifer* West.
*Cryptophagus setulosus* Sturm.
,, *scanicus* L.
,, ,, ,,
ab. *patruelis* Sturm.
,, *dentatus* Hbst.
ab. *major* Donis.†
*Henoticus serratus* Gyll.
*Atomaria apicalis* Er.
*Mycetophagus piceus* F.†
*Throscus carinifrons* Bonw.
,, *elateroides* Heer.
*Cis bidentatus* Ol.†
,, *fuscatus* Mell.†
*Rhopalodontus fronticornis* Pz.†
*Ennearthron cornutum* Gyll.†
*Heledona agaricola* F.†
*Tetratoma fungorum* F.†
*Hallomenus humeralis* Pz.†

### (*c*) In *Polyporus betulinus* Fr. ('Birch Bracket').

*Carabus catenulatus* Scop. (Twelve specimens on one occasion in Windsor Forest, 16.iv.30.)
*Oxypoda alternans* Gr.†
*Cercyon lateralis* Marsh.
*Phloeopora reptans* Gr.
,, *angustiformis* Bernh.
*Atheta aquatica* Er.
,, *cuspidata* Er.
,, *pallidicornis* Th.
,, *nigricornis* Th.
,, *humeralis* Kr.
,, *reperta* Sharp.
,, *inoptata* Sharp.
*Agaricochara laevicollis* Kr.†
*Epipeda plana* Gyll.
*Leptusa fumida* Er.
*Hypocyptus longicornis* Pk.
*Homalium vile* Er.
*Phloeocharis subtilissima* Man.

*Orthoperus mundus* Matth.
*Coccinella bipunctata* L.
*Dacne humeralis* F.†
,, *rufifrons* F.†
*Ditoma crenata* F.
*Rhizophagus bipustulatus* F.
*Thymalus limbatus* F.†
*Enicmus minutus* L.
*Cryptophagus dentatus* Hbst.
,, ,, ,,
ab. *major* Donis.†
*Litargus bifasciatus* F.
*Cis bidentatus* Ol.†
,, *fuscatus* Mell.†
,, *bilamellatus* Wood.†
*Rhopalodontus fronticornis* Pz.†
*Ennearthron cornutum* Gyll.†
*Octotemnus glabriculus* Gyll.†
*Tetratoma fungorum* F.†

### (*d*) In *Pleurotus ostreatus* Quél (' The Oyster Mushroom ').

*Cercyon pygmaeus* Ill.
,, *lugubris* Pk.
*Atheta aquatica* Th.
,, *castanoptera* Man.
,, *inoptata* Sharp.
,, *oblita* Er.
,, *sordida* Marsh.
,, *muscorum* Bris.
*Philonthus chalceus* Steph.
*Xantholinus punctulatus* Pk.
*Oxytelus tetracarinatus* Block.
*Megarthrus depressus* Lac.
,, *sinuatocollis* Lac.
,, *hemipterus* Ill.†
*Choleva fumata* Spence.
*Eumicrus tarsatus* Mull.
*Dacne humeralis* F.†
*Coninomus nodifer* West.
*Atomaria apicalis* Er.

### (*e*) In *Fomes fomentarius* Karst (' Tinder Bracket ').

*Atheta coriaria* Kr.
,, *zosterae* Th.
*Hypocyptus longicornis* Pk.
*Proteinus brachypterus* F.
*Agathidium laevigatum* Er.
*Cartodere elongata* Curt.
*Megatoma undata* Er. (One bred out.)
*Diplocoelus fagi* Chev.†
*Dorcatoma dresdensis* Hbst.†
*Dorcatoma serra* Pz.†
*Haplocnemus impressus* Ma. (One bred out.)
*Cis nitidus* Hbst.†
,, *fuscatus* Mell.†
,, *bilamellatus* Wood.†
*Ennearthron affine* Er.†
,, *cornutum* Gyll.†

## IV. A LIST OF OTHER SPECIES OF COLEOPTERA TAKEN BY ME IN FUNGI, WHICH ARE MORE GENERALLY FOUND IN OTHER SITUATIONS.

*Atheta marcida* Er., in *Lycoperdon pyriforme.*
*A. coriaria* Kr., in *Lactarius turpis.*
*A. nigricornis* Th., in *Polyporus intybaceus* and *Armillaria mellea.*
*A. amicula* Steph., in *Polyporus intybaceus.*
*A. zosterae* Pk., in *Polyporus intybaceus.*
*A. sordida* Marsh., in *Psalliota campestris.*
*Leptusa fumida* Er., in *Armillaria mellea.*
*Quedius cinctus* Pk., in *Lactarius turpis.*
*Philonthus varius* Gyll., in *Lactarius turpis.*
*P. fimetarius* Gr., in *Polyporus intybaceus.*
*Xantholinus punctulatus* Pk., in *Polyporus intybaceus.*
*Lathrimaeum atrocephalum* Gyll., in *Lycoperdon pyriforme.*
*Homalium rivulare* Pk., in *Lactarius turpis.*
*H. pusillum* Gr., in *Lactarius turpis.*
*Silpha thoracica* L. I have often found it in *Phallus impudicus*; I once found thirty-two specimens in a single ' Stink Horn.'
*Choleva nigricans* Spence, in *Polystictus versicolor.*
*C. tristis* Pz., in *Polystictus versicolor.*
*C. kirbyi* Spence, in *Phallus impudicus.*
*C. chrysomeloides* Pz., in *Fistulina hepatica.*
*Ditoma crenata* F., in *Hypoxylon fuscum.*

*Gnathoncus nannetensis* Mars., in *Fistulina hepatica.*
*Abraeus globosus* Hoff., in *Hypoxylon fuscum.*
*Epuraea aestiva* L., in *Phallus impudicus.*
*Ips 4-guttatus* F., in *Fistulina hepatica.*
*Cryptophagus saginatus* Sturm, in *Hypoxylon fuscum.*
*C. scanicus* L., in *Hypoxylon fuscum* and *Phallus impudicus.*
*C. scanicus* L. ab. *patruelis* Hm., in *Phallus impudicus.*
*C. badius* Sturm, in *Hypoxylon fuscum.*
*Atomaria analis* Er. var., in *Lycoperdon pyriforme.*
*Litargus bifasciatus* F., in *Hypoxylon fuscum, Daldinia concentrica* and *Pholiota spectabilis.*
*Tiresias serra* F., in *Polyporus dryadeus.*
*Salpingus aeratus* Muls., in *Daldinia concentrica.*
*Rhinosimus planirostris* F., in *Hypoxylon fuscum.*

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British Museum (Natural History),
Cromwell Road, London, S.W.7.
*November*, 1934.

## THE BRITISH SPECIES OF *OPHONUS* Steph.

BY CARL H. LINDROTH, MOTALA (SWEDEN).

In 1912 the late Dr. D. Sharp published in Vol. XXXVIII of this Magazine a revision of the British *Ophoni*. This was a remarkable paper as being the first attempt to arrange these difficult species after the inner anatomical characters, namely the male genitalia.

Several years later the genus was studied in the same manner by Coleopterists on the Continent (Schauberger, Coleopt. Centralblatt, I. Berlin, 1926; G. Müller, ibid., V, 1931), who, curiously, did not refer to Dr. Sharp's paper. Nor were his specific names listed in the Catalogus of Winkler (II. Wien, 1924). Only Csiki in Junk and Schenkling (Catalogus. 121. Berlin, 1932) cites most of them, some, however, in error.

As British entomologists still use, materially, the specific names given by Sharp (*e.g.* Beare, Catalogue, London, 1930), which by no means agree with those used by Central-European authors, an attempt to make a synonymisation between these two nomenclatures may doubtless be of some interest.

Sharp in his paper used several old names and described two new species. This correct application of the former, however, was uncertain, as he had no opportunity of examining type specimens. According to the above-mentioned more recent investigations, some of Sharp's names must therefore be altered. It seems noteworthy that this has not been done long ago—or that it was partly wrongly done (Csiki, 1932)—in regard to Sharp's excellent descriptions, the interpretation of which is in nearly all cases indisputable.

For greater certainty Mr. J. J. Walker, at my request, kindly sent me specimens determined by Sharp of the following of his species :—*brevicollis, rufibarbis, rupicoloides, rectangulus, parallelus*. Also from Mr. J. H. Keys I received some material, so that I have had the opportunity to examine British examples of the following species (nomenclature, see below):—*obscurus* Fbr., *diffinis* Dg., *punctatulus* Dft., *azureus* Fbr., *angusticollis* J. Müll., *melleti* Heer, *seladon* Schaub., *brevicollis* Serv., *rupicola* Sturm, *cordatus* Dft.

Of the two species described as new by Sharp, *rupicoloides* proved to be a large form of the very variable *melleti* Heer. The differences in coloration and in the punctuation of thorax mentioned by Sharp (*l.c.*, p. 209) in this species are of no specific value. A Swedish ♂ specimen of *melleti* with typical oedeagus (from the Isle of Gotland) is almost identical with the specimen of *rupicoloides* sent to me by Mr. J. J. Walker. It is unusually large (7-8 mm.), the head and thorax are red, which seems not to be uncommon in *melleti*, especially in larger specimens (vide Schauberger, 1926, p. 170) ; the thorax a little narrower than usual.

I was not able to get any material of *championi* Sharp. But as Dr. Sharp (p. 209) seems himself not to have been quite sure of its specific value and furthermore regards it as just nearly related to *rupicoloides* and his *parallelus* (=*melleti* Heer), I venture to think it will likewise prove to be a form of the latter species.

### CATALOGUE OF THE BRITISH SPECIES OF *Ophonus* Steph.

1. *sabulicola* Panz., Fowler, I, 1886, p. 44.
2. *obscurus* Fab., Fowler, I, 1886, p. 44.
3. *diffinis* Dej. ; *rotundicollis* Fowler, I, 1886, p. 44, nec Fairm. (vide Schauberger, 1926, p. 159, G. Müller, 1931, p. 45).
4. *punctatulus* Dft., Fowler, I, 1886, p. 45, Sharp, 1912, p. 231.
5. *azureus* Fab., Fowler, I, 1886, p. 45, Sharp, 1912, p. 231.
6. *puncticollis* Payk., Fowler, I, 1886, p. 46 (partim), Sharp, 1912, p. 230.
7. *angusticollis* J. Mull. (Wien. Ent. Zeit., 1921, p. 137) ; *puncticollis* Fowler, I, 1886, p. 46 (partim); *rectangulus* Sharp, 1912, p. 229, nec Thoms.
8. *melleti* Heer, 1837 (sensu Schaub., 1926, p. 169) ; *rectangulus* Thoms., 1870, nec Sharp, 1912 ; *parallelus* Fowler, I, 1886, p. 46, Sharp, 1912, p. 231, nec Dej. (vide Schaub., 1926, p. 153) ; *rupicoloides* Sharp, 1912, p. 208 ; ? *championi* Sharp, 1912, p. 209.
9. *seladon* Schaub. (1926, p. 154) ; *rufibarbis* Fowler, I, 1886, p. 46 (partim) ; *brevicollis* Sharp, 1912, p. 183, nec Serv.

10. *brevicollis* Serv. (sensu Schaub., 1926, p. 155); *rufibarbis* Fowler, I, 1886, p. 46 (partim), Sharp, 1912, p. 183.
11. *rupicola* Sturm, Fowler, I, 1886, p. 45, Sharp, 1912, p. 207.
12. *cordatus* Dft., Fowler, I, 1886, p. 45, Sharp, 1912, p. 184.

*Ophonus* Steph. is now regarded as a subgenus of *Harpalus* Latr. (*vide* G. Müller, 1931). The species *pubescens* Müll. and *calceatus* Dft. belongs to the subg. *Pseudophonus* Motsch. and *Pardileus* Gozis respectively.

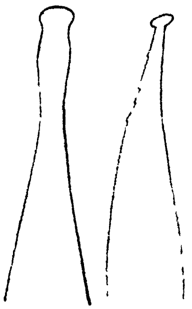
### TABLE OF SPECIES.

1. Upper surface (at least the elytra) metallic (bluish or greenish) ............ 2
—. Upper surface without metallic lustre ............ 7
2. Thorax with a very distinct raised margin along the base. Small species, 6.2—9.2 mm. ............ *azureus* Fbr.
—. Thorax without any trace of basal margin ............ 3
3. Thorax sides posteriorly distinctly sinuate; hind angles well pronounced, nearly rectangular ............ 4
—. Thorax sides rounded without sinuation; hind angles obtuse or quite deleted ............ 5
4. Only the elytra slightly metallic. Their microsculpture very diffuse, especially in the ♂. L. 7.5—9 mm. ............ *rupicola* Sturm.
—. Upper surface totally metallic. Elytra dull owing to the close and strong microsculpture. L. 8.5—11 mm. ............ *punctatulus* Dft.
5. The whole upper surface metallic. Elytra with dense black hairs, their apical emargination distinct. L. 12—15 mm. ............ *obscurus* Fbr.
—. Elytra more distinctly metallic than head and thorax. Their hairs brownish-yellow, the apical emargination slight ............ 6
6. Larger species with marked obtuse hind angles. L. 13—17 mm. ............ *sabulicola* Panz.
—. Smaller species with the hind angles completely rounded and deleted. L. 9.5—13 mm. ............ *diffinis* Dej.
7. Thorax, at least near the hind angles, with a—sometimes slightly—raised margin along the base ............ 8
—. Thorax without any trace of basal margin ............ 12
8. Hind angles of thorax quite obtuse, with broadly rounded apex. Thorax sides not at all or quite indistinctly sinuate *azureus* Fbr. (black var.).
—. Hind angles of thorax almost rectangular or a little obtuse; apex prominent, not or hardly rounded. Thorax sides distinctly sinuate posteriorly ... 9
9. Striae of elytra distinctly punctured. Thorax strongly rounded at the sides (even more so than in *rupicola*) and sinuate in the posterior fourth only. Elytra usually more or less pale brown. Oedeagus (fig. 1) without any apical disc. L. 7.5—10 mm. ............ *cordatus* Dft.
—. Striae unpunctured or nearly so. Thorax sides strongly rounded in *puncticollis* only, but in this species sinuate nearly in the whole posterior half. Elytra unicolorous, dark. Oedeagus with apical disc ............ 10
10. Thorax heart-shaped, strongly sinuate at the sides, hind angles rectangular or almost acute; thorax disc scanty, punctured (as in *seladon*, but coarser). Oedeagus (fig. 2) narrowed behind the apex; apical disc dorsally and ventrally prominent. L. 7—10 mm. ... *puncticollis* Payk.
—. Thorax sides less sinuate, hind angles with the apex slightly rounded; disc more thickly punctured than in *seladon*. Oedeagus not narrowed behind

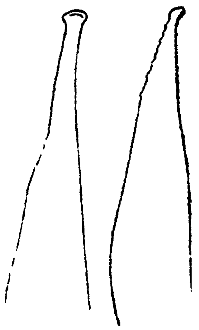
the apex; apical disc dorsally *or* ventrally prominent. (These two species can sometimes be separated by the male genitalia only.) .............. 11

11. Thorax at its broadest part usually decidedly narrower than elytra over the shoulders. Thorax base inside the hind angles slightly convexly curved. Elytra longer (almost as in *rupicola*). Oedeagus (fig. 3) slender, apical disc oblique, *ventrally* prominent. L. 6.5—9 mm. *angusticollis* J. Müll.

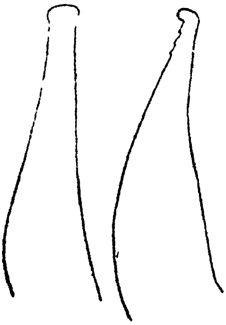
*O. cordatus* (England). Oedeagus. Ventral and side view.



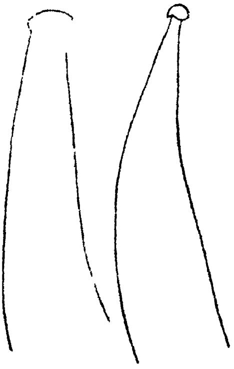
*O. puncticollis* (Sweden). Oedeagus. Ventral and side view.



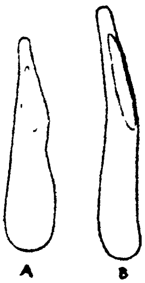
*O. angusticollis* (Denmark). Oedeagus. Ventral and side view.



*O. melleti* (Sweden). Oedeagus. Ventral and side view.



*O. rupicola* (Sweden). Oedeagus. Ventral and side view.



Oedeagus. Dorsal view.
(A) *O. seladon* (Sweden).
(B) *O. brevicollis* (Austria).

—. Thorax shorter, usually as broad as the elytra over the shoulders. Thorax base straight. Elytra shorter (as in *seladon*, but more parallel-sided). Oedeagus (fig. 4) short and stout (similar to that of *rupicola*); apical disc transverse, *dorsally* prominent. L. 5.5—8.6 mm. ... *melleti* Heer.

12. The raised margin at the sides and the base of elytra gradually merging into each other. Elytra at usual magnification (× 16—20) only in the ♀ with visible, diffuse microsculpture between the punctures and thus with a bright (usually bluish) lustre; the first interstice (at the suture) slightly brownish. Thorax sides sinuate in the posterior fourth only, but strongly so. Oedeagus (fig. 5) very stout, with apical disc. L. 7.5—9 mm. ........................................................ *rupicola* Sturm.

—. Side- and basal-margin of elytra forming an obtuse but distinct angle at the shoulder. Elytra, owing to the strong microsculpture, dull, only the extreme sutural margin sometimes brighter. Sinuation of sides of thorax longer or less distinct ........................................... 13

13. Thorax very seldom without any trace of a raised basal margin (especially near the hind angles), its sides moderately rounded. Elytra with sides more or less parallel. Oedeagus with distinct apical disc ........... 14

—. Thorax base totally unmargined, broader, with strongly rounded sides; the elytra also with more rounded sides, nearly elliptical, their broadest part often distinctly in the posterior half. Oedeagus without apical disc. (These two species must usually be determined by means of the male genitalia.) ........................................................................ 15

14. = 11 above.

15. Puncturation of the upper surface, though rather variable, usually distinctly reduced, on the disc of thorax evidently less close than at the sides; the inner interstices of elytra at most three-rowed and somewhat irregularly punctured, sometimes quite unpunctured. Thorax often broader, the sides more rounded. Oedeagus (fig. 6A) shorter and thicker, in the dorsal view somewhat asymmetrical, but only slightly curved to the links and *not* contorted. L. 6.2—9.5 mm. ................ *seladon* Schaub.

—. Puncturation closer, on the disc of thorax hardly more scanty than at the sides, on the inner interstices of elytra usually four-rowed and regular. Oedeagus (fig. 6A) much more slender, the apical half (dorsal view) curved to the links and *contorted around its axis about one-eighth of a circle to the right*. L. 7.6—10 mm. ........................ *brevicollis* Serv.

Ostermalm 4, Motala, Sweden.
*December*, 1934.

## NEW SPECIES OF STAPHYLINIDAE (COL.) FROM MAURITIUS.

BY MALCOLM CAMERON, M.B., R.N., F.R.E.S.

In a small collection of Staphylinidae sent by Mr. J. Vinson, of Moka, Mauritius, four undescribed species were present, the descriptions of which follow.

### **Holotrochus vinsoni** sp. n.

Cylindrical, shining, black, the posterior angles and posterior margin of the thorax narrowly reddish-yellow (by translucency), the elytra sometimes reddish along the suture or entirely ferruginous red; abdomen with the posterior margins of the segments narrowly rufescent. Antennae and legs reddish-yellow. Length 4 mm.

*Head* narrower than the thorax, the eyes flat, the frontal margin in the ♂ depressed in the middle and rather deeply arcuately emarginate, the right side of it a little more elevated, more produced forwards and more briefly rounded than the left and thus asymmetrical, in the ♀ straight; puncturation fine and rather sparing; ground sculpture absent. *Antennae* short, the third joint longer than the second, fourth to tenth transverse, the eighth to tenth more strongly. *Thorax* slightly transverse, the sides nearly straight, a little retracted behind, narrowly margined, the posterior angles rounded and with a scarcely visible impression adjacent, the puncturation less fine and closer than that of the head; ground sculpture absent. *Elytra* as long and as broad as the thorax, impressed along the suture, very finely, rather closely and obsoletely punctured, here and there with fine striae between the punctures. *Abdomen* coriaceous, very finely and very sparingly punctured and with scanty yellow pubescence. The punctures on the head are finer in some specimens than in others.

Les Mares, 2.v.34 (*Ray. Mamet*).

### **Coproporus vinsoni** sp. n.

Reddish-yellow, the sides and base of the head infuscate. Antennae black, the first three joints yellow. Length 1.75 mm.

Of the build and size of *atomus* and, apart from the colour, differs from that species in the much finer puncturation of the thorax and elytra, the less distinct ground sculpture of the head and thorax, although of the same transverse vermicular character.

Resembles *C. minutissimus* in the colour and sculpture of elytra but with finer ground sculpture and puncturation on the thorax. The antennae are formed as in *atomus*.

Rose Hill, 16.v.34 (*Ray. Mamet*).

### **Anebolura abdominalis** sp. n.

Narrow, subparallel, moderately shining, black, the elytra more pitchy. Antennae blackish, the first three joints and legs reddish-yellow. Length 2 mm.

*Head* suborbicular, a good deal narrower than the thorax, the eyes shorter than the post-ocular region, the sculpture consisting of small, close superficial umbilicate punctures and distinct coriaceous ground sculpture; finely pubescent. *Antennae* with the third joint as long as second, fourth about as long as broad, fifth to tenth transverse, gradually increasing in width, the eleventh as long as the two preceding together. *Thorax* nearly a half broader than long, the sides gently rounded and widened in front, straighter and more retracted behind to the obtuse posterior angles, finely and closely punctured and pubescent, finely coriaceous. *Elytra* a little broader and about a half longer than the thorax, as closely but less finely punctured, finely pubescent. *Abdomen* parallel, finely, asperately, rather sparingly punctured, especially behind, coriaceous.

♂. Posterior margin of the first (visible) dorsal segment with three spines, a small median and a longer, stouter, obliquely directed lateral one on each side; fifth with numerous fine keels, especially behind; sixth with rounded, scarcely perceptibly crenulate posterior border.

Les Mares, 17.iii.34 (*Ray. Mamet*).

The mesosternum in *Anebolura* is said to be without a keel, but I find, however, that in a co-type of the genotype (*minutissima* Bernh.) a short median keel is present, limited to the base.

### **Aleochara (Coprochara) granulicauda** sp. n.

Size and build of *verna*, but entirely black, the antennae similarly constructed and coloured, the puncturation of the head scarcely differing; the punctures of the dorsal row of the thorax are, however, less numerous and less close, towards the sides also with fewer punctures; elytra with the punctures less close and more squamose; abdomen with the sculpture coarser on the first four visible segments, whilst the fifth and sixth are closely covered with elongate granules. In the two examples the last dorsal segment is feebly rounded, the sixth ventral segment slightly produced and broadly rounded. Legs reddish-yellow. Length 1.75—2 mm.

Moka, 3.xi.34. Ex tortoise excreta (*Vinson*).

15 Teesdale Road, Leytonstone, N.11.
*January 1st, 1935.*

## *POLYDROSUS PILOSUS* GREDLER (CURCULIONIDAE, COL.), A SPECIES OF COLEOPTERA NEW TO BRITAIN.

BY HORACE DONISTHORPE, F.Z.S., F.R.E.S., ETC.
Department of Entomology, British Museum (Natural History)

'Var. **pilosa** Gredler. *Major, pilis longioribus, fuscocinereis densius, squamis parcius obsita.*

'Diese Varietat, die wir nur bei der anderweitigen Identitat, namentlich in Farbung und Bau der Fühler und Beine, sowie im Habitus der einzelnen Kortheile nicht als eigene Art anzusehen vermogen, ist hauptsachlich durch die Bedeckung charakterisiert. Die dunkeln Makeln der Flugeldecken namlich, die bei **var. pilosa** ausgedehnter, zahlreicher, nur von dunnen Schuppenstreifen getrennt und somit die Hauptfarbe bestimmen, sind da nicht nackte, sondern dicht behaart Stellen (—bei *cervinus* finden sich nur einzelne, zerstreute und kurzere Harchen—); ebenso die grunlichgrauen und kupferglanzigen Schuppen langlicher, keilformig. In gleicher Weise ist auch Kopf, Halsschild und Bauch behaart. Die Grosse bedentender als bei der Art.—Diese Form stammt aus Passeier (*Gdlr*).' 'Die Kafer von Tirol.' Bozer 1866, p. 313.

Gredler treats this insect as a variety of *Polydrosus cervinus* L., but it has long been recognised as a good species and is, of course, abundantly distinct. It is considerably larger, the ground colour is a deeper black; there is a distinct pattern on the elytra; the black patches are covered with fine dark hairs, and not almost bare as in *cervinus*; there are thin, long, coppery scales mixed with the broader ones; the rostrum is longer; the whole body is more hairy; the tarsi and nearly the entire funiculi are black; and the coppery scales on the thorax form a distinct longitudinal stripe in the centre.

The scales in all the *cervinus* I have seen are more golden than coppery, whereas in the specimens of *pilosus* with which this note is concerned they are all copper-coloured. There are, I believe, green forms of both species. [I have taken the green form of *cervinus* = *melanotus* Steph. (*virens* Boh.) at Purley Downs in 1893, and at Mickleham in 1904.] Moreover, *pilosus* occurs on fir trees, spruce, etc., and *cervinus* on birch.

*Polydrosus pilosus* was taken freely in 1934 by Mr. J. Hignett in a fir plantation near Oswestry, Shropshire, by beating young spruce trees. When I was looking through his collection recently he showed me large specimens of a *Polydrosus* which he had under *cervinus*, but about which he was not at all satisfied. I told him they were not *cervinus*, but a species new to Britain. He gave me specimens to take to the Museum and when I got home I at once 'ran them down' with Reitter as *P. pilosus* Gredler.

As there were no specimens in the general collection at the Museum, I asked my friend Sir Guy A. K. Marshall if he possessed the species. He found he had specimens from Germany which exactly agreed with Mr. Hignett's insect, thus confirming my identification.

*P. pilosus* occurs in Scandinavia, Germany, France, Austria, Italy, Central Europe, Montenegro, the Tirol, etc.

British Museum (Natural History),
London, S.W.7.
*January 18th,* 1935.

## A NEW SPECIES OF *CIXIUS* (HOMOPTERA, CIXIIDAE) FROM SNOWDON.

BY W. E. CHINA, M.A.

(British Museum (Nat. Hist.) Dept. of Entomology).

In September, 1933, Mr. H. W. Daltry submitted to me several specimens of a strange-looking *Cixius* which he and Mr. H. Britten had taken during the summer on the slopes of Snowdon in North Wales. These specimens appeared to differ from all the known British species, and on comparison with Continental species they seemed to be identical with *C. sticticus* Rey. Now this species is recorded only from South France and Spain; according to Rey it is common at Hyères on Evergreen Oak (*Quercus Ilex*). Its occurrence on Snowdon would therefore be very difficult to explain, since it could scarcely have been introduced in such a locality in recent times. Examination of the male genitalia, however, revealed several differences and the Snowdon species is therefore described as new.

### **Cixius cambricus** sp. nov.

Vertex about three times wider than long, in front rounded, not angular, the black spots on each side of middle line ('Taches des fossettes du vertex' Fieber) more or less rounded, not rectangular or transverse. Frons and clypeus black, with carinae yellow, the median carina only narrowly so up to median ocellus. Pronotum and tegulae yellow, the lateral carinae of former posteriorly margined with black. Mesonotum and carinae black. Tegmina colourless hyaline with a narrow brown transverse band at level of claval fork, somewhat interrupted towards the costal margins; this band almost obsolete in the males; veins pale yellow, with small rounded brown setigerous granules; transverse veinlets black and a certain amount of infuscation of apical cells in some specimens; stigma brown granulate only along interior margin; costal granules relatively small, but longer than those of the other veins; 9—12 in ♂ and 13—15 in ♀ placed rather along inner edge of costa; the apical margin of tegmen not granulate between the apical veins. Front and middle legs brown, the extreme apices of femora and bases of tibiae pallid; hind legs pale yellow, with ultimate tarsal segment brown. Anal tube (fig. 1*b*) stout, dark brown, with the apical lateral lobes dilated and rounded, pallid. Styles axe-headed, the apical margin convex (fig. 1*c*). Aedeagus (fig. 1*a*) with conjunctival spines more or less symmetrical, hook-shaped; the right-hand auxiliary spine long and narrow; the dorsal lobes of phallosoma more or less symmetrical.

Length, including tegmina, ♂ 5 mm., ♀ 5.2 mm.

Habitat: SNOWDON. On the slopes below the Crib Goch above Llyn Llydaw at 1,600-1,900 ft., 2 ♂♂ (including type) and 2 ♀♀, 10.vi.1933 (*H. W. Daltry* and *H. Britten*).

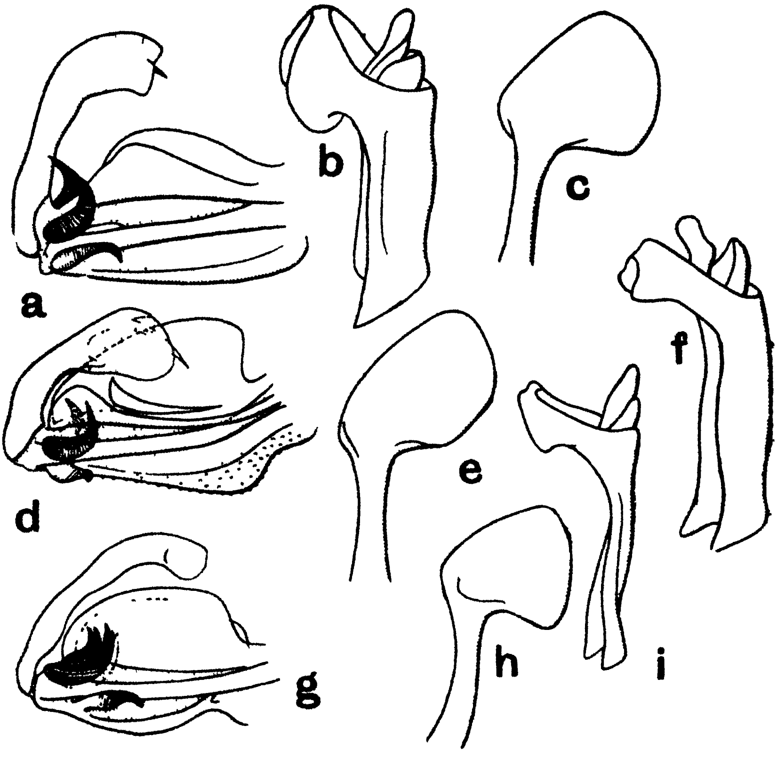


FIG. 1.

*Cixius cambricus* sp.n.

(*a*) Male aedeagus from the right; (*b*) anal tube; (*c*) style (paramere).

*Cixius stictícus* Rey.

(*d*) Male aedeagus from the right; (*e*) style; (*f*) anal tube.

*Cixius similis* Kbm.

(*g*) Male aedeagus from the right; (*h*) style; (*i*) anal tube.

Runs down in Fieber's (Rev. Mag. Zool. 27, pp. 176-195, 1876) and Edwards' (Hem. Homopt. Brit. Is., p. 24, 1896) keys, to *C. similis* Kbm. (Fig. 1, *g*, *h* and *i*) from which it differs in colourless tegmina with transverse fuscous band and black cross-veins and in the apically acuminate conjunctival appendages of aedeagus. Very closely allied to *C. sticticus* Rey (Fig. 1, *d, e* and *f*) from which it differs in the more or less symmetrical dorsal lobes of the phallosoma, the narrower and more elongate right hand auxiliary conjunctival appendage, and the dilated lateral apical lobes of the anal tube.

It seems probable that *C. cambricus* has been evolved from *C. sticticus* since the time when the range of that species was much more northern. It is reasonable to suppose that *C. sticticus* is a relic of the ancient Lusitanian fauna which inhabited Western Europe in Cretaceous times. This fauna is xerothermic in character and was driven southwards at the outset of the wet climate of the late Tertiary period. It is probable that *C. cambricus* was produced at this time at the northern limit of the Lusitanian fauna and became adapted to the wet Tertiary climate of Britain. With the coming of the glacial period from the north it must have retreated southwards, but with the change to a drier climate in post-glacial Britain it moved northwards again and became extinct except in Snowdonia, where the rainfall was sufficiently high. In this connection Mr. Daltry informs me that 'Llyn Llydaw is the wettest place in the British Isles with an average of about 180 inches a year—half an inch a day.' My colleague Dr. K. G. Blair tells me that in the Coleoptera there is a similar case of distribution, though not quite parallel. The handsome beetle *Chrysomela cerealis* L. in Britain is only known to occur on Mt. Snowdon, but on the Continent it is widely distributed in Middle and South Europe. It is not possible to explain this without a knowledge of the ecological requirements of this species. It is possible that a study of the genitalia would reveal it to be actually distinct from the Continental form just as *C. cambricus* is distinct from the superficially identical *C. sticticus* Rey.

British Museum (Natural History),
Cromwell Road, London, S.W.7.
*November 9th, 1934.*

*The Dobree Collection of European Noctuae.*—This important collection has been in the Municipal Museum at Hull for many years, and a catalogue of which (XV, 156 pp., price one shilling) was issued in 1909 contains a certain number of type specimens. In the interests of students of Entomology it seems desirable that the place of these should be in the National Collection, and arrangements have been made whereby they are now deposited in the Natural History Museum at South Kensington, which has supplied suitable specimens to take their places.—Eds.

*The Occurrence of Aradus aterrimus Fieb. in Kent in 1933-34.*—While collecting with Mr. L. C. Bushby in a wood near East Malling on 26th November, 1933, an immature specimen of an Aradid, which later proved to be *Aradus aterrimus* Fieb., was discovered amongst some rotting sacking. Charcoal-burners had been at work on the site during the previous year, and a number of sacks were left in a heap, as they were too rotten to contain the charcoal. The wood was visited again the following week and some dozen more Aradids were found in the sacking; they seemed to prefer those covered with fungus and containing a little charcoal-dust.

Mr. G. L. Hey also found a nymph, which was at first thought to be *Aradus depressus*, but later proved to be *A. aterrimus*. It was discovered at East Malling in the course of an examination of a series of corrugated cardboard bands placed around the stems of apple trees to trap *Anthonomus pomorum* (L.) Curt. This specimen was found about half-a-mile away from the site of the charcoal-burning operations. In July the writer also found an adult female in a heap of hedge-brushings a mile south of the original locality.

Adults and nymphs were found in the decaying sacking until the first week of October, 1934. The sacking was kept damp during the hot summer months, and additional sacking was added to the heap from time to time. On the afternoon of Friday, October 5th, some unknown person visited the wood with a car and removed all the sacking, completely clearing the site; no more specimens have since been discovered.

Five nymphs collected in November, 1933, were kept in a small tin box. They did not reach maturity until the end of August, 1934. Each larva only moulted once, thus they remained in the last instar ten months. All proved to be males.

Two specimens of *Aradus aterrimus* were recorded for this country over seventy years ago, and no further occurrence up to the present. The species is represented in the Scott collection by a ♂ without data and is apparently the specimen mentioned by Butler as 'ex. Coll. Harding.' The only other British example was a female from Darenth Wood, May 30th, 1861.

*Aradus aterrimus* Fieb. was first described by Fieber (Wien Ent. Monatschr., VIII, p. 210, 1864), Douglas and Scott's record being dated 1865, from a ♂ sent to him from England by Douglas. Thus the specimen in the Natural History Museum must be the type of the species seen by Fieber.

As suggested by Kiritshenko (Faun. Russie, VI, Pt. I, p. 249, 1913), the common Siberian *A. morio* Jak. is identical with the rare and sporadic European *A. aterrimus* Fieb., which Kiritshenko had not seen Mr. W. E. China has compared Fieber's type with a specimen of *A. morio* Jak. from Siberia determined by Kiritshenko and finds them identical. *A. morio* Jak. 1889 therefore becomes a synonym of *A. aterrimus* Fieb. Mr. China also states that in Kiritshenko's Monograph of Palaearctic Aradidae the East Malling specimens run down to *A. aterrimus* Fieb.

The writer wishes to take this opportunity of thanking Mr. W. Steer, of East Malling, for diagnosing the species, and Mr. W. E. China for confirming it, and for the full details regarding the synonymy of the species given above. —A. M. Massee, 'Acarina,' East Malling, Kent: *December 31st, 1934.*

*Anthicus tobias Mars. in Britain.*—Early in 1934 I had an opportunity, thanks to Mr. Massee, of collecting some nymphs of *Aradus aterrimus* Fieb. These I placed in a new breeding cage with some of the rotting, mouldy sacking in which they occurred. Having succeeded in rearing some of the nymphs, I turned the cage out about the middle of August to ascertain how the remaining nymphs were progressing, and was surprised to see an *Anthicus* run out of the sacking, which was obviously not any of those recorded for this country. It proved to be a freshly emerged example of the above species.

*Anthicus tobias* is recorded from India, Arabia, Mesopotamia and Turkey, and one would of course assume that it had been imported in the sacking in the egg or larva state, but from enquiries which Mr. Massee has kindly made from the charcoal-burners all the sacks used were new ones obtained in Maidstone; further, the sacks had been lying in the wood for at least two years. The species must of course be treated as an introduced one, at least for the present.

My thanks are due to Dr. K. G. Blair for confirming my identification of the species.—E. C. Bedwell, 54 Brighton Road, Coulsdon, Surrey: *January 2nd*, 1935.

*On the occurrence of Lyctus brunneus Steph. in Great Britain.*—I was much interested in the note published by Mr. C. E. Stott in this Magazine for December, 1934, on the occurrence of *Lyctus brunneus* in Staffordshire.

Within recent years the Forest Products Research Laboratory has collected records of the occurrence of *Lyctus* spp. in timber in Great Britain and has also carried out an extensive survey* of the premises of timber importers, merchants and manufacturers using timber. During the course of this work, and from advisory correspondence, records of *Lyctus brunneus* have been obtained from home-grown timber, chiefly oak, from most parts of England, whilst it has also been recorded from Central Scotland. Indeed, the results of these investigations show that *Lyctus brunneus* now occurs more frequently in home-grown timber than does the indigenous species *L. linearis*. The occurrence of *Lyctus* spp. throughout England and Scotland is undoubtedly largely dependent upon the distribution of infested timber, both home-grown and imported. On the other hand, information on the natural distribution of *Lyctus* spp. in fallen limbs of trees, etc., is lacking. One wonders whether the specimen of *Lyctus brunneus* which entered Mr. Stott's study originated from neighbouring trees, from a local timber yard, or even from some *Lyctus*-infesteed article of furniture or other timber in the vicinity. In this connection it may be of interest to point out that the distance to which *Lyctus* beetles are able to fly has never been determined.—Ronald C. Fisher, Forest Products Research Laboratory, Princes Risborough, Buckinghamshire: *January 7th*, 1935.

*Occurrence of Odontoscelis dorsalis Fabr. in E. Kent.*—The receipt of a couple of Suffolk specimens of this species from my friend Mr. E. C. Bedwell recently prompted me to look over my series of *O. fuliginosa* Linn. from the Deal district, taken in 1930 (June 30th to July 4th). I found, to my surprise, that, though six actually were this species, the other six—all from Sandwich Bay—were undoubtedly *O. dorsalis*. At that time I had no description of the latter, hence the oversight. I sent the whole series to Mr. Bedwell, who agrees with my determination. From my notes it appears that one, or perhaps two, were taken at the roots of marram grass right on the foreshore, between the houses and Prince's Golf Club House; one was running in the open and the remainder were under *Erodium cicutarium*, between the Club House and Shell Ness. All the *O. fuliginosa* were taken on Deal sandhills, *i.e.* between Deal and the nearest house at Sandwich Bay, under *Erodium* plants. Mr. Bedwell thinks that this is a new locality for *O. dorsalis*, and has asked me to publish it.—H. W. DALTRY, Bar Hill, Madeley, Crewe: *January 5th*, 1934.

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* Forest Products Research Bulletin No. 16.—H.M. Stationery Office.

*Phaonia mirabilis Ringd. in Cardiganshire.*—Last August I was fortunate enough to take two specimens of this rare and beautiful fly on a window of a farm in the Ystwyth Valley, about three miles from Aberystwyth. I am indebted to Miss Aubertin for putting me on the track of their identity. They correspond exactly to the very full description given by Mr. J. E. Collin (under the name *P. keilini*) in 'Parasitology,' Vol. IX, p. 441. He there records the species only from Cambridge and the New Forest. Ringdahl originally described it in Ent. Tidskr., 1916, p. 233, from the male only. The dimensions given by Mr. Collin are 8—10 mm. My male, taken on August 8th, 1934, is fully 10 mm., and my female, taken on August 25th, hardly more than 7.5 mm.—L. W. GRENSTED, 30 Charlbury Road, Oxford: *January 5th*, 1935.

## Reviews.

'THE COMPLETE BOOK OF BRITISH BUTTERFLIES.' By F. W. FROHAWK, F.R.E.S., M.B.O.U. Pp. 1—384, Plates I—XXXII. Price 10/6. London: Ward, Lock & Co. Ltd. December, 1934.

Eleven years have elapsed since Mr F. W. Frohawk published his great work on our Diurnal Lepidoptera, 'The Natural History of British Butterflies.' This book embodied a profusion of original details of the life-history of these insects drawn from his personal observations, as well as a series of plates reproduced from his beautiful drawings of every species in all stages of development, which at the time were unsurpassed in excellence by those of any extant work on the subject. The size and cost of the two volumes, however, placed them beyond the means of all but a few students of the Order; and we congratulate the author and his publishers on their enterprise in presenting them with a work on a more convenient scale, containing all the essential features of its predecessor, with the addition of the knowledge that has been acquired since its appearance.

After a 'Foreword' by Lord Rothschild, and brief but adequate sections on such subjects as classification, aberration, migration, collecting and rearing, and a highly useful list of the food-plants of the larvae, our butterflies in all their stages are described with a wealth of detail by the author, who has enjoyed the unique experience of rearing every species from the egg during the last forty years or more. Special attention may be directed to the records of the migration to our Islands of the American *Danaus plexippus*, here brought fully up to date, and to the minutely detailed and most interesting life-history of the 'Large Blue,' *Maculinea arion*, in the elucidation of which Mr. Frohawk has had so prominent a share.

The transformations of the sixty-eight butterflies now recognised as British are depicted on thirty-two plates, reproduced from the author's original drawings used in the work of 1924 by the 'four-colour' process. These more condensed plates are even more pleasing to the eye than the earlier ones, and when their fidelity in detail, brilliancy of colour, and accuracy of reproduction are considered, it is safe to say that never before have our British butterflies been presented in so faithful and artistic a manner. It were perhaps invidious to refer to any figures as outstanding in merit; but we would draw special attention to those of *Argynnis paphia* (Pl. IX), *Nymphalis antiopa* (Pl. XIII), *Apatura iris* (Pl. XV), and the literally 'life-like' picture of *Vanessa atalanta* on the 'jacket' of the book. The difficulties presented by the adequate reproduction of the subtle differences in colour of the ' Blues ' have here been successfully surmounted, though in a very few cases, notably in the underside of *Lycaena dispar*, the full colour-values have not been quite attained.

The ' half-tone ' figures in the text, more than 160 in number, mainly of the resting attitudes of the insects reproduced from the author's sketches in the field, and of many notable aberrations, are even more interesting and instructive, if possible, than those of the plates themselves.

When, in addition to the foregoing details, the excellence of the printing and binding is considered, the book is indeed a marvel of good value at its price. We can imagine no more delightful and acceptable present to the young Lepidopterist, who will have the advantage of commencing his study of our British butterflies under the most recent classification and nomenclature as revised by the Committee of the Royal Entomological Society, which is followed throughout the work, and to which, it must be acknowledged, some at least of the ' old hands ' are not yet fully habituated.

' THE MACROLEPIDOPTERA OF THE WORLD.' Edited by Dr. Adalbert Seitz. I. Section. Fauna Palaearctica. Supplement. Parts 49—52. 3 Plates. Stuttgardt : Alfred Kernen, Publisher. 1934.

We have received the four parts above enumerated of this great work, which deal entirely with the Noctuid moths of the Palaearctic Region not enumerated in the main Volumes. Dr. M. Draudt is, as before, responsible for the letterpress, and the three plates maintain the high standard of excellence of their immediate predecessors.

## Obituary.

*Frederick Augustus Dixey, M.A., D.M., F.R.S.*—It is with profound regret that we announce the tragic death of this well-known and greatly esteemed Entomologist. On the evening of January 14th he was knocked down by a motor-car in Park Lane, London, and sustained a fractured skull and other severe injuries; and two days later he passed away in St. George's Hospital, whither he had been conveyed after the accident. The sad news only reached the Royal Entomological Society at the conclusion of the Annual Meeting on the 16th; and on January 23rd he was laid to rest in the churchyard at Friern Barnet, Herts., where his wife is interred.

Frederick Augustus Dixey was born in London on December 9th, 1855, and was educated at Highgate School, whence he went up in 1874 as a scholar to Wadham College, Oxford. His active association with Wadham, except for a brief interval (1880-3), during which he was Demonstrator of Physiology at University College, London, remained unbroken until 1928, and he held in succession the responsible offices of Junior Bursar, Bursar, and Sub-Warden; and on his retirement he was elected an Honorary Fellow of his College.

His reputation as a finished classical scholar, and as the author of several memoirs on medical science of high importance, joined to his activities in the religious and social life of his College, as well as with the old Volunteers and the Officers' Training Corps, made him an outstanding figure in the University. But we are chiefly concerned with him here as one of the best-known and most accomplished Entomologists of our time. As our leading authority on the Pierine butterflies of the world, the succession of exhaustive memoirs from his pen, most of which appeared in the Transactions of the Entomological Society of London, dealing with the phylogeny, mimetic associations, geographical distribution, and general bionomics of this important section of the Lepidoptera, and more especially his elaborate researches in connection with the characteristic scent-scales or plumules, and their importance in the indication of the affinities and determination of species, have taken high rank as Entomological classics. Of equal value and interest are his papers on mimicry in butterflies, and the phylogenetic significance of their wing-markings, as well as his two Presidential Addresses to the Entomological Society. The fine and extensive series of his favourite Pierine butterflies in the Oxford University Museum was the object of his special care, and no opportunity was overlooked by him of adding to its completeness and efficient arrangement.

In recent years he made three contributions to our Magazine of more than ordinary interest. The first of these (Vol. LII, pp. 10–13, 46–51, 119–125) is a charming narrative of his visit to Australia with the British Association in 1914, and in Vol. LXVI (pp. 170–176) is an equally interesting summary of his entomological experiences on the African tour of the Association in 1929. An exhaustive account of the Pierine butterflies which were collected during the voyages of the late Admiral E. G. Bourke appears in our volume for 1933 (pp. 92–102).

Dr. Dixey became a Fellow of the Entomological Society as long ago as 1887; he was a Vice-President in 1904–5, and occupied the Presidential Chair in 1909–10. In the latter year he was elected a Fellow of the Royal Society, and in 1919 he was President of the Zoological Section of the British Association at the Bournemouth meeting.

For many years he had been a widower, and is survived by two sons and a married daughter, to whom we extend our most heartfelt sympathy and condolence in their tragic bereavement. To his wide circle of friends, scientific and otherwise, his loss is indeed a grievous one, and nowhere will his kind face and genial presence be more sadly missed than in the 'Hope Department' of the Oxford University Museum.—J. J. WALKER.

## Society

*Wednesday, November 21st,* 1934.—DR. S. A. NEAVE, O.B.E., President, in the Chair.

The following were elected Fellows of the Society: H. Abdul Hafiz, B.A., Imperial College of Science and Technology, South Kensington, S.W.7: Howard E. Hinton, B.Sc., Zoological Laboratory, The Museums, Cambridge.

The death of Mr. S. T. Klein, elected a Fellow in 1887, was announced.

The Secretary read the following list of Fellows nominated by the Council for the ensuing year:—For President: S. A. Neave, O.B.E., M.A., D.Sc. For Treasurer: Francis Hemming, C.B.E. For Secretary: A. W. McKenny-Hughes, D.I.C. For other members of Council:—Professor W. A. F. Balfour-Browne, M.A., F.R.S.E.; Professor P. A. Buxton, M.A.; Professor G. D. Hale-Carpenter, M.B.E., D.M.; C. L. Collenette; H. Eltringham, M.A., D.Sc., F.R.S.; Brigadier W. H. Evans, C.S.I., C.I.E., D.S.O.; G. Fox-Wilson; A. D. Imms, Sc.D., M.A., F.R.S.; K. Jordan, Ph.D., F.R.S.; R. Stewart MacDougall, M.A., LL.D., D.Sc., F.R.S.E.; N. D. Riley; J. A. Simes, O.B.E.; W. H. Thorpe, M.A., Ph.D.; C. B. Williams, M.A., Sc.D.

The Rev. E. B. Ashby exhibited some French butterflies. Mr. R. B. Benson exhibited some high mountain sawflies of Britain. Professor G. D. Hale Carpenter exhibited and discussed (1) a Hesperiid migrating in the Congo and (2) a Mantid and its Sphingid prey. Professor E. B. Poulton, F.R.S., exhibited and discussed (1) on behalf of Mr. H. C. Kenway, photographs of *Charaxes p. saturnus* Butl. larva emerging from the egg, and recent interesting captures of *Charaxes* and of female butterflies after heavy rain; (2) on behalf of Mr. L. E. Andrewes, notes on Dorset Lepidoptera in 1934, and abnormal epigamic behaviour of a male *Aglais urticae* L.; and (3) the homing of the 'ladybird' *Coccinella bipunctata* L. Mr. H. St. J. K. Donisthorpe exhibited two rare beetles from Wicken Fen. Miss L. E. Cheesman gave a talk on an entomological expedition to Papua, illustrated by lantern slides.—A. W. McKenny-Hughes, *Hon. Sec.*

*Wednesday, December 5th,* 1934.—Dr. S. A. Neave, O.B.E., President, in the Chair.

The Secretary read for the second time the nominations of the Council for Officers and Council for 1935.

The following were elected Fellows of the Society: Walter William Baum, Hazelhurst, 68 Hillmorton Road, Rugby; Andrew G. Hamilton, Imperial Institute of Entomology, British Museum (Natural History), Cromwell Road, S.W.7.

The death of Mr. G. C. Leman, elected a Fellow of the Society in 1920, and of Major H. C. Jeddere-Fisher, elected a Fellow in 1928, was announced.

The Hon. Secretary exhibited a specimen of *Phryxe vulgaris* Fall. as a parasite of *Borkhausenia pseudospretella* Stn. Mr. E. B. Ford exhibited and discussed the first recorded capture of *Argynnis pandora* Schiff. in England. Professor E. B. Poulton, F.R.S., exhibited and discussed (1) on behalf of Mr. H. B. Cott, warning colours and mimicry, illustrated by lantern slides, with a concluding section by Professor Poulton terminating the controversy with Dr. W. L. McAtee; and (2) notes on Coccinellid and other associations of aposematic insects. Miss L. E. Cheesman exhibited and discussed the habits of a new Reduviid bug from Papua, illustrating her remarks with lantern slides, and Dr. H. Eltringham, F.R.S., Mr. A. Musgrave, and Mrs. M. D. Brindley made comments. Mr. D. J. Lewis discussed the disappearance of Tabanid flies from a swamp in Albania. The Rev. Maurice T. Beckett, O.B.E., exhibited a new apparatus for preventing damage by heat to specimens placed in an epidiascope.—A. W. McKenny-Hughes, *Hon. Secretary.*

## THE PARASITES OF BRITISH BIRDS AND MAMMALS. III.—ON SOME PARASITES LIVING IN THE NEST OF THE HOUSE MARTIN (*CHELIDON U. URBICA* Linn.).

BY GORDON B. THOMPSON
(Department of Entomology, British Museum (Nat. Hist.).)

For the greater part of the material with which this note is concerned, I am indebted to Mr. P. A. D. Hollom. During the early days of September Mr. Hollom sent me the linings of three House Martins' nests. All three nests were taken from the sewage farm near Weybridge Station, Surrey. They were built under the eaves, which project 6 in. to 9 in. beyond the wall of the building, at heights varying roughly between 8 ft. and 13 ft. above the ground-level. Altogether there were about thirty nests round the building, all of which were inhabited during the season. Some

House Sparrows also nested on the building but not in the immediate vicinity of any of the nests sent by Mr. Hollom. The three nests were chosen on account of the fact that they had most recently been left by the birds, presumably the second brood of the year. The time which elapsed between the birds leaving the nests and their collection was probably two days at the most. In the case of nest No. 1 the young birds were just about to leave it when Mr. Hollom went to take it, and he was able to catch two of the young birds for examination for parasites. Martins have nested on the same building for the past five years, but whether the nests under consideration have been occupied during previous seasons Mr. Hollom was unable to say. Each nest was constructed of mud with a rough lining of feathers (probably chickens' feathers) and pieces of straw.

The nests, when collected, were placed directly into linen bags and sent to me. On arrival I examined each nest separately and made a careful census of the various parasites which were found. The results of this census are tabulated below and following this are some notes on the various species.

| NAME OF PARASITE. | | NEST NO. 1. (From East side of building) | NEST NO. 2. (From South side of building) | NEST NO. 3. (From West side of building) |
|---|---|---|---|---|
| *Ceratophyllus* sp. (or spp.) (Larvae) ... | | Too numerous to count | Too numerous to count. | Too numerous to count. |
| *Ceratophyllus hirundinis* Curtis | Adults .. | 34 | 92 | 32 |
| *Oeciacus hirundinis* (Jenyns)* | .. .. | 56 | 356 | 138 |
| *Stenepteryx hirundinis* (Linn.) | Puparia ... | 19 | 42 | 8 |
| | Adults ... | 9† | nil | 4 |
| *Dermanyssus gallinae* (Redi) | Adults ... | nil | 4 | 8 |
| | Immatures. | Very few. | Very few. | Very few. |

## GENERAL NOTES ON THE SPECIES FOUND IN THE NESTS.

### SIPHONAPTERA.

Ceratophyllidae.

Four species of fleas have been recorded from the nests of House Martins in the British Isles, they are as follows:—

*Ceratophyllus hirundinis* Curtis (1832).
*Ceratophyllus farreni* Rothschild (1905).
*Ceratophyllus rothschildi* Waterston (1910).
*Ceratophyllus rusticus* Wagner (1903).

In the nests under consideration only *C. hirundinis* Curtis was found. There is a possibility that one or more of the remaining species listed above may yet occur as the numbers of larvae[*] present in each nest was very great and adults are continually emerging. It appears from the published records that *C. rothschildi* Waterston and *C. rusticus* Wagner are comparatively rarer species than *C. farreni* Rothschild and *C. hirundinis* Curtis, the last being the commonest of all.

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* All stages except the first.

† Four were taken off a young bird.

All the adults of *C. hirundinis* Curtis that were collected appeared recently to have emerged, and the males greatly exceeded the females in numbers. In nests Nos. 2 and 3, three pairs were taken in copula. The larvae are easily seen and move about quickly when disturbed, but the pupae are exceedingly difficult to find. Some pupae were found in the empty puparia of *Stenepteryx hirundinis* (Linn.). On the few occasions when I did find pupae, the outer cases were impregnated with fine particles of the mud from the nests and usually attached to a piece of the straw or feather or in tiny cavities in the mud. The emergence of *C. hirundinis* Curtis, which I was able to observe in a few instances, was by a forward movement, and the adult insect was able to move about and even to jump almost immediately. These observations correspond with those of Waterston (1910) on the hatching of *C. farreni* Rothschild.

## HEMIPTERA.

Cimicidae.

*Oeciacus hirundinis* (Jenyns), 1839.
Ann. Mag. Nat. Hist. (1), 3, p. 242, fig.

This species was described by Jenyns, from specimens found 'swarming' in martins' nests in Cambridgeshire, as a *Cimex*. Stål (1837) erected the genus *Oeciacus* for its reception, and the only other species contained in the genus is *O. vicarius* Horvath (1912), which occurs in the nests of the Cliff Swallow and Barn Swallow in North America. Records of the occurrence of *O. hirundinis* Jenyns in the British Isles are very few. After the species was described by Jenyns, Douglas and Scott (1865) mention having seen specimens from a House Martin's nest taken at Tunbridge Wells; Saunders (1892) took spacimens 'in the windows of a house at Chobham over which a martin had nested.' Saunders also mentions the following records: Stoke Holy Cross (*Edwards*) and 'off dead swallow,'[†] Armagh (*Johnson*). Butler (1923), summarising the records, states that it has been recorded from seven English counties and the North of Ireland but not from Wales or Scotland.

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[*] All the larvae have since pupated and only *C. hirundinis* Curtis continues to emerge, 15.xii.1934.

[†] This occurrence of *C. hirundinis* (Jenyns) on a swallow is probably a genuine case of straggling.

It was therefore extremely interesting to find the species occurring in such large numbers in the nests received from Mr. Hollom. Adults were by no means as numerous as the immature stages, and females predominated. I am inclined to agree with Butler's statement that the species must be considered rare though where found it is usually abundant.

*O. hirundinis* (Jenyns) is considerably smaller than *Cimex lectularius* Linn., the bed bug, and very much more hairy. When seen in the nests they are, owing to their hairiness, covered with small particles of mud, thus rendering them almost indistinguishable from their surroundings. When disturbed they either remain perfectly still or run very quickly and disappear into a crevice in the mud.

Through the kindness of Mr. W. E. China I am able to add two more records of the occurrence of this bug. The specimens are in the National Collection. (1) Specimens obtained from a house on which martins had nested at Mill Hill, Middlesex, 21.vi.1934; (2) specimens from a House Martin's nest at Brookman's Park, Herts, vi.1934 (*R. Maxwell Savage*). These records extend the distribution of the species to two more counties in England.

## DIPTERA-PUPIPARA.

### Hippoboscidae.

*Stenepteryx hirundinis* (Linn.), 1761.

This Hippoboscid is, as far as I can tell from previous records, a specific parasite of the House Martin in the British Isles. In this species the wings are considerably reduced and are in fact useless for flight purposes. The fly can, however, run very quickly, its movements being very erratic. The number of puparia present in the nests tends to indicate that they remain as such throughout the winter and until the return of the House Martins, when they can emerge to find a ready supply of food. Of the nine adults from nest No. 1 four were taken off a young bird just as it was about to leave the nest. It would be interesting to learn to what extent the adults of *S. hirundinis* (Linn.) are carried by their hosts. The puparia vary considerably in size, are shining black and very similar to the puparia of *O. avicularia* (Linn.) in general shape.

## ACARINA.

### Dermanyssidae.

*Dermanyssus gallinae* (Redi), 1674.

This mite is better known as the 'fowl mite.' It is remarkable that so few specimens were found in the nests, as Dr. S. Finnegan tells me that the species occurs commonly in many birds' nests and has been recorded from House Martins' nests by Hirst (1916). I have found it swarming in the nests of swallows. Since keeping the nests I have noticed that nearly all the adults have died but there still remain a few living examples of the immature stages.

NOTE.—Judging from the total number of parasites present in each of these nests and considering that they are all blood-suckers the House Martins must have a very uncomfortable time of it.

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British Museum (Natural History),
Cromwell Road, London, S.W.7.
*November 9th, 1934.*

# NOTES ON THE PASSALIDAE (COLEOPTERA).

## NO. 5. SYNONYMIC NOTES, WITH THE DESCRIPTIONS OF A NEW GENUS AND NEW SPECIES.

BY W. D. HINCKS, M.P.S., F.R.E.S., M.S.B.E.

*(Concluded from Vol. lxx, p. 274.)*

### Subfam. PASSALINAE (*continued*).

### *Ptichopus* Kaup.

*P. angulatus* (Perch.), 1835.

This is a common and variable Central American species, and it seems probable that the following are at the most only local races of it: —*P. inca* Kuw. 1891, *nitidus* Kuw. 1891, *montezuma* Kuw. 1891, *aberrator* Kuw. 1891, *inflatus* Kuw. 1898, *Borellii* Rosmini 1902 (n. syns.).

Before turning to the Old World *Passalidae* it will be necessary to refer again to the genus *Passalus* and the subgenera established by Luederwaldt (vide Hincks, 1933*a*, p. 178). Zang (1905) has pointed out that the name *Eumelus* Kaup (1871) is preoccupied by *Eumelus* Raf. (1820) and proposed *Gnomon* in place of Kaup's name, which change seems to have been overlooked by subsequent authors. *Eumelus* is therefore no longer available for Luederwaldt's second subgenus, but as it contains Kaup's *Mitrorhinus* (1871) that name becomes available and may be used in place of *Eumelus*. The type of the subgenus will be *Passalus cayor* Perch.

*Passalus* has already been substituted for Luederwaldt's third subgenus *Phoroneus*. The latter name established by Kaup (1869) is preoccupied by *Phoroneus* Raf. (1815) as noted by Zang. It will not be necessary, however, to change the name of the first section of the subgenus *Passalus* (of Luederwaldt's arrangement), as these group names have no nomenclatoral significance and are used in the same way as a specific name might be used in denoting a group of species within the subgenus.*

### Subfam. SOLENOCYCLINAE.

### *Didimus* Kaup.

The original spelling is adopted instead of the corrected form of Zang — *Didymus*.

*D. haroldi* Kuw. 1898.
=*duplicatus* Kuw. (nec Har.), *fur* Kuw. 1891, *latro* Kuw. 1891, *parastictus* Gravely (nec Imhoff), *curvilineatus* Arrow 1907, *congoensis* Arrow 1907 (n. syns.).

The synonymy here suggested calls for some explanation, and a separate note on the subject will appear elsewhere.

*D. nachtigalli* Kuw. 1891.
=*luederitzi* Kuw. 1891, *emini* Kuw. 1891, *petersi* Kuw. 1891 (n. syns.).

*D. punctipectus* Kaup 1868.
=*fraudator* Kuw. 1891, *simulator* Kuw. 1891 (n. syns.).

### Subfam. MACROLININAE.

The genera *Mastochilus*, *Pharochilus*, *Analaches* and *Cetejus*, treated by Gravely (1918) as subgeneric divisions of the first-named, are here tentatively accorded full generic status by the writer on the grounds that members of these genera can be correctly placed at a glance.

### *Mastochilus* Kaup.

*M. australasicus* (Perch) 1841.
=*mülleri* Kuw. 1891, *perinvitus* Kuw. 1891, *distans* Kuw. 1898 (n. syns.).

Kuwert himself seems to have been a little doubtful of the specific distinctness of these names (1898, p. 328) and was uncertain which was typical *australasicus*.

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* Opportunity is taken of correcting the following errors in previous parts of this paper:—Vol. lxx. p. 154, l. 6, *Cetejus schenklingi* Heller is the species referred to, not *Analaches puberulus*; p. 271, 8th line from bottom, read *stolli* for *sulcifrons*; p. 272, read *Aponelides* for *Aponeletues*.

### *Pharochilus* Kaup.

*P. politus* (Burm.) 1847.
=*languidilabris* Kuw. 1891, *rugiceps* Westw. 1845, *bilineatopunctatus* Kuw. 1891, *brevidentatus* Kuw. 1898, *compar* Kuw. 1898 (n. syns.).

The synonymy established above is probably correct. Kuwert suggested that his *languidilabris* was only a variant of *politus* and that *compar* was very near *brevidentatus*. Arrow (1907) examined the type of *rugiceps* and pronounced it as very near *politus* and probably identical with *brevidentatus*.

### *Labienus* Kaup.

*L. inaequalis* Gravely 1918.

This species was described by Gravely from Arfak, Dutch New Guinea, and Moreira (1932) has since recorded it from Aru. The writer has examined two examples from the British Museum which considerably increase the known range. These were collected by the Challenger Expedition and purport to have been taken in Ternate and Queensland.

The var. *proximus* Hincks 1933, described as a var. of *trigonophorus* (Zang), should be transferred here. It is closely similar to typical *inaequalis* but differs in its larger size, almost symmetrical outer tubercles (due to attrition?) and more rounded anterior angles of the thorax.

Below two new species of *Labienus* are shortly diagnosed. They are included in a small but very interesting collection of Passalidae made by Miss L. E. Cheesman in New Guinea and sent by Mr. Arrow for determination. Full descriptions of these species and notes on the whole collection will be published elsewhere when the material is completely worked out.

### **L. cavifrons** n. sp.

Belonging to the *trigonophorus* group (*vide* Hincks, 1933*c*, p. 156).

Closely allied to *L. trigonophorus* (Zang.), but differs in having mentum without primary scars; head with large lateral impression near anterior margin between frontal ridge and fronto-vertical suture, and thorax with only faint trace of median furrow.

Differs from *L. inaequalis* Gravely in having nearly symmetrical outer tubercles and by the presence of lateral impressions on the head, which also distinguish it from v. *proximus*.

Differs from *L. protomocoeloides* Hincks in having frontal ridges complete throughout and in having an entirely different frontal area.

Length 34 mm.

One example (type). Papua: Ishurava, 3,000 ft., vii.1933 (*L. E. Cheesman*). British Museum Collection.

### **L. cheesmanae** n. sp.

Antennal club with ultimate four lamellae long, basal two very short. Mentum with secondary scars not widely divergent and meeting behind to cut of a median area. Inner tubercles of head prominent, joined by a broad curved ridge. In front of inner tubercles frontal ridges absent and frontal area and anterior part of head form a more or less flat plate. Outer tubercles simple, projecting laterally, forming with a prominence on anterior margin of head near their base an emargination into which upper tooth of mandible more or less fits.

Head impunctate. Thorax with median groove strong, interrupted in front; scars without piligerous punctures. Elytra impunctate.

Length 42—44 mm.

Five examples (type and paratypes). Papua: Ishurava, 3,000 ft., vii.1933 (*L. E. Cheesman*). British Museum Collection.

This species is not closely allied to any of the species known to the writer. It perhaps comes nearest to *L. horrelli* Hincks, from Sudest Island, but has an entirely different head.

### *Protomocoelus* Zang.

*P. australis* (Boisd.) 1835.

=*impressicollis* Kuw. (nec Boh.), *gestroi* Kirsch 1879, *vogeli* Kuw. 1898, *fallax* Kuw. 1898 (n. syns.).

*P. heynei* Kuw. 1891.

=*difficilis* Kuw. 1898 (n. syn.).

It was with deep regret that the writer recently received news of the death of Dr. Hermann Luederwaldt, whose excellent work on the Brazilian Passalidae (see bibliography) has done so much to improve the systematics of the American subfamilies. Dr. Luederwaldt was born on January 23rd, 1865, and died on August 5th, 1934. He was an assistant at the São Paulo Museum and will be remembered by his work not only on the Passalidae but also on the Lucanidae and Coprinae.

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46 Gipton Wood Avenue, Leeds, 8.
*January 7th*, 1935.

## NOTES ON THE DISTRIBUTION OF *GNYPETA COERULEA* SAHLB. IN BRITAIN.

BY JAMES H. KEYS, F.R.E.S.

In 1901, when corresponding with the late Monsieur A. Fauvel, I offered to send him specimens of the above-named Staphylinid beetle. The reason for my doing so I have forgotten. He replied to the effect that *G. coerulea* did not occur in England, that it was peculiar to Scandinavia and Finland, and that our species was *G. ripicola* Kies. Feeling assured that at all events our local insect was correctly named, I thereupon despatched a few specimens of it to Monsieur Fauvel, which in due course were acknowledged and their identity as the true *G. coerulea* Sahlb. was confirmed by him.

In September of last year, doubt of the identity of the *coerulea* was raised by Dr. Carl Lindroth, of Motala, Sweden, with whom I was in touch at that time, and who wrote to me as follows: 'I also take the opportunity to ask you regarding the *Gnypeta* listed as *coerulea* Sahlb. in Great Britain. It seems to me possible that the species may have been confused with *ripicola* Kies. . . . I should be glad to see some Devon specimens of *coerulea*.' Accordingly some local examples of the beetle were forwarded to Dr. Lindroth. He replied: 'I can only confirm the correct determination of the species.'

In view of this correspondence, it is curious that in the previous June-July, when staying at South Brent, I should meet with *G.*

*coerulea* in abundance. It seems desirable, therefore, to record the experience. I was residing at a farm about a mile from the River Avon where it flows close by the little town, and is easily accessible through some meadows just below the church. I paid several visits to the river, and on four occasions brought home from thence a bagful of moss, scraped from boulders and stones more or less submerged in its waters. Owing to the drought just then prevalent it was easy to move about the bed of the river and select suitable patches of the moss. The weight of one of these bags was 12 lb.; the others I did not scale, but it may be fairly estimated that I dealt with at least 45 lb. of the moss (including, of course, in the weight the water, gravel, etc., collected with it). The locality was a flat meadow and the extent of the river from which moss was collected was about 150 yards. The bags were hung up to drain and examined the next day. The Staphylinid beetles taken were as follows: 6 *Aloconota sulcifrons* Steph., 2 *A. cambrica* Woll., 4 *Metaxya elongatula* Gr., 2 *M. tomlini* Joy, 2 *M. malleus* Joy, whilst of *Gnypeta coerulea* Sahlb. upwards of 100, 1 *Quedius umbrinus* Er., 1 *Actobius cinerascens* Gr., 2 *Lathrobium quadratum* Pk., *Dianous coerulescens* Gyll. in some numbers, but I did not collect any, 4 *Stenus guttula* Müll., 3 *Ancyrophorus aureus* Fauv., 2 *Lesteva luctuosa* Fauv., 1 *Trogophloeus rivularis* Mots., 1 *T. corticinus* Gr. The predominance of the *G. coerulea* is remarkable. Respecting other water beetles, *Orectochilus villosus* Müll. was very abundant, but *Hydropori* were almost absent. Of *H. marginatus* Duft. and *H. septentrionalis* Gyll. one only of each occurred, and although I worked very thoroughly with the water-net I failed to obtain a second example of either species.

The altitude of the meadow in question is about 400 ft. I worked the river above the meadow below Lydia Bridge, but had no captures. Probably the overhanging trees made it too shady. Still higher up the river above Lydia Bridge, where also the river is well wooded, *Dianöus* was the only result. And at Shipley Bridge (about 800 ft.) on the edge of the moor, some three miles above South Brent, I could find very little moss in the river, and from about half-a-gallon of moss secured one *G. coerulea* only.

My first capture of *G. coerulea* was in 1895 (at which time it was a great rarity), in the shingle of the River Meavy at Yelverton (about 400 ft.); later it occurred on the moor both below and above Cadover Bridge (about 600 ft.); in the River Dart near Postbridge; the River Erme at Ivybridge; the River Walkham near

Merivale Bridge; the River Tavy near Hill Bridge (about 800 ft.). The late Mr. Philip de la Garde obtained the beetle at Buckfastleigh and at Christow near Exeter. Mr. Rendel took it in the Tiverton district. It is recorded by the late Mr. W. G. Blatch from Lynmouth, taken by Mr. G. W. Tait, in 1891; and here also the late Mr. G. C. Champion took it in 1907. Mr. G. H. Ashe tells me that he met with *G. coerulea* 'at Okehampton in August, 1929, and, as far as I remember, the beetle was in some numbers. . . . The moss growing on flat slabs of rock, and was not at all a plentiful growth.' It is evident, therefore, that the beetle is firmly established and widely distributed in Devon. Apparently it has not yet been taken in Cornwall.

In Mr. F. H. Day's 'Coleoptera of Cumberland' (1911) *G. coerulea* is recorded as not uncommon on mossy banks in river beds, also in flood-refuse. In answer to my inquiries, Mr. Day kindly tells me that he has 'always regarded it [*coerulea*] as an insect of mountain streams, where it occurs at an elevation of 1,000 ft. and upwards. Exceptionally it may be sometimes found in flood-rubbish in winter. . . . I have never found many specimens at any one time, never having brought home the moss for examination . . . probably a dozen or so were the most taken at any one time.'

Dr. Fordham's 'Yorkshire Coleoptera in 1919' has one record —' Malham (J.W.C.).'

Mr. Bullock informs me that *G. coerulea* has not yet been taken in Ireland. For Scottish records I can only refer to Fowler's 'Coleoptera,' Vol. II, p. 143. Of Welsh records I have no knowledge.

Dr. Joy's 'Handbook,' Vol. I, p. 55, states: 'England S.W., W., N.; Scotland, very local; in moss by mountain streams.'

Dr. Lindroth very kindly informs me that in Sweden '*Coerulea* is an exclusively northern species . . . so it seems surprising that it does occur in the British Isles to the furthest south.' In respect to the altitude of its habitat Dr. Lindroth says: '*Coerulea* occurs in Northern Scandinavia at sea-level as well as in the Alpine regions, but further South it becomes more exclusively a mountain species.'

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*January*, 1935.

# A CRABRONID (HYMENOPTERA) NEW TO THE BRITISH LIST.

BY G. E. J. NIXON, B.A.

It is at the request of Dr. O. W. Richards that I place on record the occurrence of an interesting Hymenopteron, *Crabro* (*Ectemnius*) *dives* Lep., which I have taken over a period of five years on the railway bank which passes my garden at Tulse Hill, S.E. London. The record is unfortunately somewhat belated. Dr. R. C. L. Perkins is responsible for the determination of the original specimens, which, at the time he saw them, were the property of the British Museum.

The dates of capture are as follows:—Aug., 1926, 3 ♂♂, 2 ♀♀, on flowers of a yellow Umbellifer (wild parsnip?); end of July, 1928, 1 ♂; May, 1929, 1 ♂; June, 1930, 1 ♂; these three males were taken from holes in a telegraph-pole which stands about thirty yards from the place where the parsnip grows. Since the last date, I have never systematically searched for the species again.

It may be suspected that the insect has been introduced in timber. A timber-yard, situate some three-quarters of a mile further down the line lends support to this opinion. In any case, it seems unlikely that so conspicuous a species should have escaped the detection of Hymenopterists if it really were a native of this country.

*Crabro dives* Lep. bears a superficial resemblance to *C.* (*Clytochrysus*) *chrysostomus* Lep., but is actually amply distinct from this species as from all the other allied British species. Its most characteristic feature is evidently the acute spine into which each lateral, anterior angle of the pronotum is produced. Both sexes have the mesonotum clothed only with extremely short hairs, so that this part has a somewhat glabrous appearance. The first funicular segment (third antennal) is only about twice as long as apically wide in the ♀; in the ♂ it is excavated over its basal two-thirds (roughly) and is feebly produced distal to the excavation. In the ♂, further, the first segment of the anterior tarsus is distinctly and evenly dilated throughout and is translucent whitish. According to Schmiedeknecht in 'Die Hymenopteren Nord-und Mitteleuropas,' the subgenus *Ectemnius* is provided with an extra tooth at the middle of the upper margin of the mandibles. There are numerous other characters which render this species very distinct, at least among British Crabronids. To enumerate them without emphasising their significance would serve no purpose, so I propose to leave this task to some one better qualified to carry it out.

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*February 5th, 1935.*

## ADDITIONAL HOSTS OF *ANOMOEA ANTICA* WIED. AND *SPILOGRAPHA ALTERNATA* FALL.

BY G. FOX WILSON
(R.H.S. Laboratories, Wisley, Surrey).

The publication of a recent note on British Trypetidae (1) and the mention of *Crataegus monogyna* (Whitethorn) as the host-plant of *Anomoea* (*Phagocarpus*) *antica* Wied. (*permundus* Har.) has prompted me to place on record the host-plants of this and another Trypetid—the Rose-Hip Fly, *Spilographa alternata* Fall.—as found in the Royal Horticultural Society's Gardens at Wisley, Surrey.

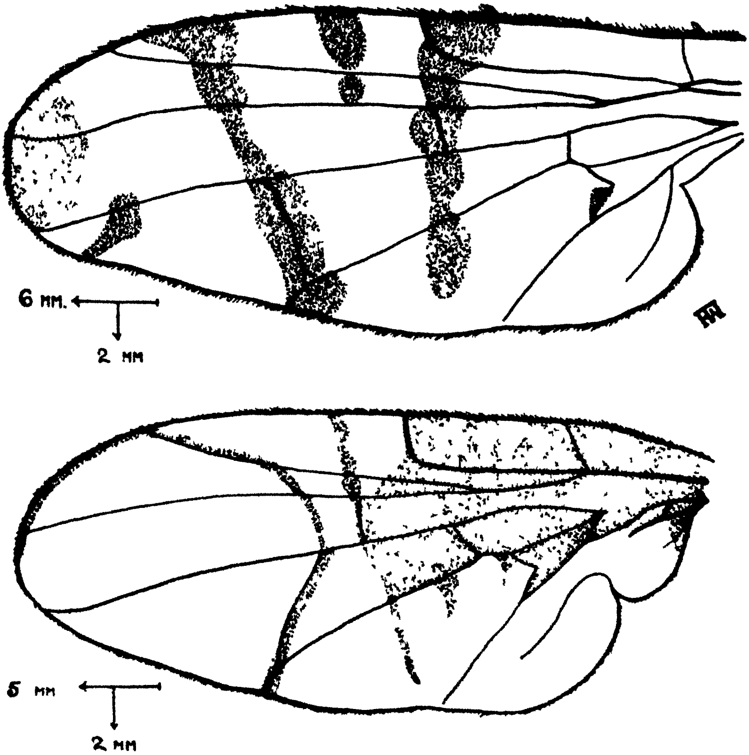
*Anomoea antica* was first recorded from *Berberis* and *Cotoneaster* in 1929 (2), the larvae being found in the fruits of ten species of *Berberis* and two species of *Cotoneaster* at Wisley during the autumn of 1928. Brief descriptions of the larval, puparial and adult stages together with notes on the life-histories of both species have been published (3), and it is intended in this note to make mention only of one fact concerning the habitat of the puparia of *A. antica*.

Lindner (4), quoting Perris, states that the larvae pupate in the fruit, and this we have found only under conditions of storage when the fruits are being dried for the purpose of obtaining seed. When the fruit is allowed to develop normally on the plant, the larvae on reaching maturity either fall to the ground or reach the soil in fallen fruits, pupation taking place a few inches below soil-level. Niblett (*loc. cit.*) agrees with Handlirsch that the larvae pupate in the soil.

The normal host-plant in this country and on the Continent would appear to be Hawthorn or Whitethorn, *Crataegus monogyna*, a statement which may lead one to suppose that this species may have a far wider distribution in this country than the paucity of records suggests.

It is interesting to note that this species occurs not only in the fruits of certain Rosaceae, e.g. *Cotoneaster*, *Crataegus*, *Pyracantha* and, possibly, *Sorbus* (5), but in the fruits of one genus belonging to the Berberidaceae. The fact that plants belonging to two fairly widely separated Natural Orders are attacked calls for further investigation as to whether a biologic race or an incipient species is involved in the infestations.

*Spilographa alternata* has been recorded from the fruits of *Rosa* by several authors, for instance, by Kaltenbach (6) in fruits of *Rosa species* (89); Houard (7) in fruits of *Rosa species* (3,248); and by Lindner (8) in fruits of *Rosa villosa.*



Wing of *Anomoea antica* Wied. and *Spilographa alternata* Fall.

A complete list of host-plants of both species of Trypetid as found at Wisley is appended.

### LIST OF HOST-PLANTS AT WISLEY, 1928—1934.

*ANOMOEA ANTICA* WIED.

*Berberis canadensis.*
,, *concinna.*
,, *diaphina.*
,, *dictyophylla.*
,, *guimpeli.*
,, *Jamesiana.*
,, *koreana.*

*SPILOGRAPHA ALTERNATA* FALL.

*Rosa alpina pyrenaica.*
,, *blanda.*
,, *calocarpa.*
,, *canina.*
,, *canina danica.*
,, *canina dumalis.*
,, *Chaberti.*

*ANOMOEA ANTICA* Wied.

*Berberis lycioides.*
,, *Lycium.*
,, *morrisonensis.*
,, *orthobotrys.*
,, *platyacantha.*
,, *Regeliana.*
,, *rubrostilla.*
,, *ruscifolia.*
,, *sibirica.*
,, *spathulata.*
,, *Thunbergii.*
,, *Tischleri.*
,, *triacanthophora.*
,, *Vilmorinii.*
,, *virescens.*
,, *yunnanensis.*
*Cotoneaster affinis.*
,, *bullata.*
,, *buxifolia.*
,, *divaricata.*
,, *frigida.*
,, *pannosa.*
*Pyracantha coccinea Lalandei.*

*SPILOGRAPHA ALTERNATA* Fall.

*Rosa cinnamomea.*
,, *feneliensis.*
,, *glauca.*
,, *gymnocarpa.*
,, *lucida.*
,, *macrantha.*
,, *mollissima.*
,, *moschata alba.*
,, *Moyesii.*
,, *multibracteata.*
,, *nutkana.*
,, *oxyodon.*
,, *parviflora.*
,, *pomifera.*
,, *rubiginosa.*
,, *rubrifolia.*
,, *rugosa* (Belski (9); Ukraine)
,, *Selongeana.*
,, *sericea.*
,, *Sweginzowii*
,, *virginica.*
,, *Woodsii.*

In drawing attention to the list of *Rosa species* it is desirable to state that, owing to the degree of synonymity that exists in the genus *Rosa*, a general acceptance of the specificity, however desirable, is not possible.

My acknowledgments for help received are made with sincerity to Dr. F. W. Edwards (British Museum, Natural History) for identifying the material, and to Dr. M. A. H. Tincker (Wisley Laboratory) for bringing to my notice several infestations of Rose-Hip Fly in fruits of *Rosa species*.

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(6) Die Pflanzenfeinde aus der Klasse der Insekten, 1874, p. 224.
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Royal Horticultural Society's Gardens,
Wisley, Surrey.
*November 24th*, 1934.

# NOTES ON BRITISH *COLLEMBOLA*.

BY RICHARD S. BAGNALL, D.SC.

(*Continued from Vol. lxx, p. 277.*)

In the second part of these notes I bring forward four littoral or halophilous species of the genus *Onychiurus*, all of which are additions to the British fauna, though one of them, *O. caledonicus* sp. n., is very probably the species recently recorded by Davies from the Welsh coast as *O. octopunctatus* Tullb. All four species were taken in a sheltered part of the coast near Edinburgh together with *Anuridella marina*, but three of them have been taken rarely on the East Coast of England. It is apparent that one may expect to find them plentifully only where sheltered conditions exist such as are to be found in the mouth of the Forth, and it is possible that lessened salinity brought about by the confluence of the river may be a secondary favourable condition.

I intend to deal with the genus *Onychiurus* in a later part and will therefore simply describe the new species herein. I find pleasure in dedicating one of them to the late Wm. Evans, who did so much to further our knowledge of the Scottish fauna.

I should here express my gratitude to my friend Mr. F. Laing of the British Museum, not only for his encouragement and help, but more especially for the use of a medium by which I am able to make the numerous necessary microscopic preparations of these and other delicate creatures with a minimum of labour and time

Throughout these notes I use the symbols PAO. and pso. for post-antennal organ and pseudocelli respectively and AH. for anal horn or horns.

In an addendum I propose a new name for the *Onychiurus sibiricus* of Handschin nec Tullberg.

## II. On four littoral species of *Onychiurus*

### **Onychiurus caledonicus** sp. n.

Length c. 1.4—1.6 mm.

Pso. of the head numbering 4+4 at the antennal bases and 4+4 at the basal margin; small. Of those at antennal base the three outer (2—4) are situated on a slightly curved line and are widely separated, the inmost (1) being situated on a higher plane obliquely from and more closely to 2. Antennal organ III with five papillae; PAO. of *armatus* type furnished with about forty tubercles, which appear, for the most part, to be well separated laterally. AH. stoutish and scarcely curved, laterally about three times as long as broad at base, situated on low, well-separated tubercles. Genital opening *surrounded* by a field of inwardly directed setae.

Feet strong, not broad, claw of hind foot about 1.7 times as long as the AH.; inner margin without tooth; empodium tapering to bristle-like termination, without lamella and not much more than 0.5 the length of the claw.

Sharply distinguished from *armatus* by the larger number of pso. on the head, the larger number of PAO. tubercles and the relatively longer foot with its much shorter empodium, and from *octopunctatus* by the smaller pso. of head, the larger number at base of head (4 + 4 compared with 3 + 3), the more essentially *armatus*-type of PAO. and its substantially larger number of tubercles, the less strong AH. and the form of foot with its short empodium.

SCOTLAND: Coast of Dalmeny Estate near Cramond, one example only with *Anuridella marina*, *O. debilis*, etc., vii.34, but several more from both sides of the Almond, viii.34; S. Queensferry, xi.34.

ENGLAND, E. YORKS: Two examples of *Onychiurus* found on the shore at the foot of the cliffs at Thornwick Bay, near Flamborough, ix.34, after an hour's hard search proved to be referable to this species.

### *Onychiurus debilis* Mon.

A smaller species than *armatus*, with fewer PAO. tubercles—usually c. 20—and having the empodium of the foot somewhat less than 0·5 the length of the claw.

I have found several isolated examples on the East Coast of England from Northumberland, Yorks, Essex and Kent, but at Cramond, where I first found it associated with *Anuridella marina*, and at S. Queensferry it is moderately plentiful, vii-viii.34.

First British records.

### **Onychiurus evansi** sp. n.

Length about 1.2 mm.

In the open oval form of the PAO. this species comes near *O. neglectus* Schäffer (1896) and *O. litoreus* Folsom (1917); the latter species (which is also halophilous), however, has the 20 or so tubercles closely set and their lateral margins touching, whilst the pso. of the head number 2 at the base of each antenna and 2+2 (paired obliquely) at the basal margin. In *neglectus* the PAO. is much as in *litoreus*, the tubercles numbering 18—20, whilst the pso. of the head number 3 at the base of each antenna and 2+2 at the basal margin; and the foot differs from both *litoreus* and *evansi* in that the empodium is without basal lamella, short and stiletto-like.

In *O. evansi* the tubercles of the PAO number 12—16 and are distinctly separated from each other laterally; the empodium of the foot is lamellate basally, as in *litoreus*, but is only 0.25 to 0.3 the length of the claw, whilst the pso. of the head, which are small, number 1 at the base of each antenna and 1+1 at the basal margin. The AH. are short and obconical, well separated, placed on low tubercles, and only c. 0.4 the length of the hind claw.

SCOTLAND: Dalmeny Estate, Cramond, two examples, vii.34.

### **Onychiurus scoticus** sp. n.

Length 1.6 mm.

Belonging to the *sibiricus* group. Head with 3 large pso. at the base of each antenna, which are broadly rimmed, situated in a slightly curved line, equidistant and close together, the space between each being less than their diameter; hind margin of head with 2+2 pso. paired obliquely, *in the presence of which it differs from all its allies.* Antennal organ III with 5 well-extended papillae. PAO. with 14—18 tubercles more or less irregular in form, one or more of which may be broadly biramous; though of *sibiricus* type, these tubercles are longer and less broad than in others of the group.

The inner margin of the claw is furnished with a minute tooth near middle, the empodium is bristle-like distally, without lamella, and reaches at least to the tip of the claw.

The AH. is stoutish, about 0.5 as long as the hind claw, well separated, and not mounted on tubercles.

This is the first British species belonging to the *sibiricus* group proper and is at once separated from *sibiricus* Tullb., *similis* Fols., *cocklei* Fols. and *alticola* m. (see addendum) by the number of pso. of the head—in the three first-named there is only one and in *alticola* two at the base of each antenna, *whilst all of them are devoid of pso. in the hind margin of the head. O. scoticus* can therefore only be compared with *O. subtenuis* Fols., in which species there are two (or three) large broad-brimmed pso. at the base of each antenna, which are much as in *scoticus, but* as in the other species of the group the hind-margin of the head of *subtenuis* is without pso.

SCOTLAND: Dalmeny Estate and Cramond, several examples, vii-viii. 34, and ENGLAND: single examples from the coasts of Durham (Ryhope) and E. Yorkshire (Flamborough).

### ADDENDUM.

### **Onychiurus alticola** sp. n.

For *Onychiurus sibiricus* Handschin, 1920, Verh. Naturf. Ges. Basel, XXXII, p. 14, figs. 8-11, *nec* Tullberg, Axelson

Separated from *sibiricus* by the possession of 2+2 basal antennal pso. (compared with 1+1), by the number of papillae (4 compared with 5) of the antennal sense-organ III, by the long, slender AH. and the long empodium.

SWITZERLAND: High Alps.

Handschin is probably right in referring *O. similis* Fols. to *sibiricus* Tullb., but I cannot see how either *sibiricus* or *similis* can be associated with the species described by Handschin. as *sibiricus*. *O. sibiricus* is fortunately well known; it is figured by Tullberg and closely described and figured by Axelson.

London.

*September 23rd,* 1934.

*Some recent captures of Coleoptera.*—The following Coleoptera, among many other more common species, have occurred to me during the past two years in various localities in the south of England.

Swanley Wood, Farningham, Kent: April–June, 1933.—Under bark of plum and apple trees: *Cryptophagus populi* (2), *Oxytelus insecatus* (1). Under fungi on elm: *Endomychus coccineus, Staphylinus brunnipes, Tetratoma fungorum.* In boleti: *Cis bilamellatus* (abundant), *Dacne humeralis, Cis punctulatus* (a few in *Polyporus* on bark of dead standing pine, in April; I have often searched for it since, but unsuccessfully). At roots of grass, etc.: *Notiophilus rufipes, Byrrhus fasciatus, Philonthus immundus* (1), *Podabrus alpinus* (common), and *Gonodera luperus* (1, on whitethorn blossom). By sweeping, etc., in the lane leading to wood: *Micrambe villosa, Syncalypta spinosa* (1), *Cantharis livida* var. *rufipes* (2 specimens, the type abundant), *C. haemorrhoidalis,* etc., *Limonius minutus* and *L. aeruginosus* (especially on nettles), *Hedobia imperialis* (1), *Grammoptera holomelina* (1), *Dascillus cervinus* (1), a black specimen of *Agriotes pallidulus, Anaglyptus mysticus* (1), *Tanymecus palliatus* (1), *Liparus coronatus* (1), *Gymnetron rostellum* (1 from plum blossom), *Staphylinus compressus* (1). By beating, in the wood: *Selatosomus nigricornis* (common on sallow in one spot), *Agrilus angustulus, Rhynchites sericeus, Balaninus glandium, Magdalis carbonaria* and *Cryptocephalus punctiger* (2 of each from birch), *Saperda populnea* (1, aspen), *Leiopus nebulosus* (larch faggots), *Pogonochaerus hispidus* (holly). Under stone: *Ophonus azureus* (1). In and under bark of oak stumps: *Silvanus unidentatus, Laemophloeus ferrugineus* (1), and *Ditoma crenata* (abundant, perhaps parasitic on *Scolytus intricatus* and *Dryocoetes villosus*), *Quedius maurus, Cis hispidus, Xyleborus saxeseni, Platypus cylindrus.* In dead bird: *Necrobia violacea, N. rufipes, Dermestes vulpinus, Aleochara lata,* etc.

Pegwell Bay, Kent: September, 1931.—*Masoreus wetterhali, Quedius hammianus, Dichirotrichus obsoletus,* etc.

Blackheath, S.E.: 1933–4.—In house: *Ptinus sexpunctatus* (1), *Carpophilus ligneus* (1, in tinned fruit). On pear trees in garden: *Magdalis barbicornis* (common), *M. pruni* (rarer). On elm: *M. armigera, Atactogenus exaratus.* In vegetable refuse, etc.: *Clambus minutus, C. pubescens, Monotoma longicollis, M. bicolor, Philonthus agilis, Oxyomus sylvestris.* Under clods: *Platyderus ruficollis, Lathrobium ripicola, Hister merdarius.* The following species common in the axils of reeds in a pond: *Telmatophilus schoenherri, Ocyusa maura, Gnypeta carbonaria, Pachnida nigella, Alianta incana, Calodera riparia* (?), *Trogophloeus corticinus, Stenus solutus* (scarce), *S. binotatus, S. incrassatus.*

Arundel, Sussex: June, 1933.—Ditches, etc.: *Donacia aquatica, D. marginata, D. vulgaris, D. semicuprea, Plateumaris affinis, P. nigra, Thryogenes nereis.* On *Atropa*: *Epitrix atropae* (common). On *Cynoglossum*: *Longitarsus quadriguttatus* (several specimens entirely black). On or under bark of decayed beech, in the park: *Saprosites mendax* (with *Dorcus* and *Sinodendron*), *Lucanus cervus, Platycis minutus* (in August, 1929), *Tillus elongatus* (1), *Thanasimus formicarius* (1), *Prionychus fairmairei* (several), *P. ater* (rarer), *Helops coeruleus, Tomoxia biguttata* (only in the hot sunshine, settling on beech logs, flying very readily, and difficult to capture), *Rhinosimus viridipennis, Cicones variegatus, Mycetaea hirta* (2 only), *Litargus bifasciatus, Mycetophagus atomarius, Diphyllus lunatus* (in the fungus *Sphaeria concentrica*), *Cis bilamellatus.* On ash: *Hylesinus crenatus.* On post, near river: *Anoncodes melanura* (2). On bramble: *Pyrochroa coccinea* (1).

Chalk downs near Mickleham, Surrey: May–July, 1933.—Under decayed beech bark: *Scydmaenus rufus, Ptinella aptera, Micromalus flavicornis, Cerylon ferrugineum, Cis alni, C. bilamellatus, Orchesia undulata, Rhinosimus viridipennis, Platycis minutus* (abundant on old beech stump, August, 1931). Under small powdery fungi on beech logs: *Enicmus testaceus, Anisotoma humeralis, Sphindus dubius* (in profusion). Under bark of old stump: *Hallomenus binotatus.* In horse-dung: *Aphodius zenkeri, A. foetens,* etc. In dead rabbit: *Staphylinus pubescens.* On *Echium*: *Meligethes murinus, Longitarsus exoletus, Ceuthorrhynchus geographicus, C. asperifoliarum* (2), *Sibinia signata* (1). By general sweeping: *Liodes badia* (1), *Antherophagus nigricornis* (1), *Phyllotreta nodicornis, Aphthona herbigrada, Batophila rubi* (1), *Chrysomela goettingensis, Apion waltoni, A. atomarium* (1), etc. By beating: *Malthinus balteatus, Malthodes fibulatus, Phytodecta pallida* (1, hazel), *Anthribus variegatus* (fir), *Apion simile* (1, birch), *Mordellistena pumila, Oedemera lurida.*

Windsor Forest and Park: May and June, 1934.—Under bark of oak: *Euthia linearis* (1), *Mycetophagus piceus, Plegaderus dissectus, Micromalus flavicornis, Enicmus testaceus, Lathridius constrictus* (1), *Pediacus dermestoides* (perhaps parasitic on *Lyctus canaliculatus*), *Ditoma crenata* (an entirely orange form), *Teredus cylindricus* (also one under beech bark), *Ctesias serra, Megatoma undata* (1), *Elater coccinatus, E. balteatus, Procraerus tibialis, Trixagus carinifrons* (1), *Lymexylon navale* (♀ ♀ only, common), *Ptinus subpilosus* (1), *Mycetochara humeralis* (also in beech), *Conopalpus testaceus* (1), *Phloeotrya rufipes* (also under beech bark), *Xyleborus dryographus* (in great abundance), *Platypus cylindrus, Dendrobium denticolle* (and 1 in Richmond Park in hawthorn), *Thanasimus formicarius, Opilo mollis, Mesosa nebulosa* (remains), *Phymatodes testaceus, Glischrochilus quadriguttatus.*

By beating, chiefly oak: *Agrilus laticornis, A. angustulus, Malthinus frontalis* (fir), *Cryptophagus pubescens* (1), *Trinodes hirtus, Selatosomus quercus, Prosternon holosericeus, Dorcatoma chrysomelina, D. flavicornis, Anaspis garneysi, Scraptia fuscula, Hylophilus pygmaeus* (not rare), *Pseudocistela ceramboides* (1), *Abdera biflexuosa, Magdalis cerasi.* Under bark of beech: *Cicones variegatus, Hister striola* (1), *Tillus elongatus* (♀ ♀ only, common), *Elater rufipennis* Steph. (remains only, in plenty), *Cis pygmaeus, C. festivus, C. bilamellatus, Leptura scutellata* (not uncommon, and one under oak bark), *Rhyncolus truncorum.* In fungi: *Eledona agaricola* (abundant), *Rhopalodontus fronticornis, Aspidiphorus orbiculatus* (1, in hard woody fungus). In dung: *Aphodius putridus.*

Brockenhurst, New Forest: May, 1934.—By beating: *Hyperaspis reppensis, Anthaxia nitidula* (1, sloe), *Corymbites tessellatus* (birch), *Sericus brunneus, Grammoptera ustulata* (1, whitethorn blossom), *Cetonia aurata, Rhynchites coeruleus* (1). Under bark of oak: *Corticaria fenestralis, Elater cinnabarinus* (1 from oak and 1 from beech), *E. pomonae* (common, and a few of the var. *pictaviensis*), *E. elongatulus, Phymatodes testaceus.* Under bark of beech: *Thymalus limbatus, Plegaderus dissectus, Leptura scutellata* (1), *Orchesia undulata, Mycetochara humeralis* (1), *Pyrochroa coccinea.* In fungi on oak: *Ennearthron cornutum, Cis castaneus.* Under bark of pine stump: *Pediacus dermestoides* (1), *Glischrochilus olivieri* (1).

Andover, Hants.: July, 1933.—On hazel: *Apoderus coryli, Polydrusus sericeus* (1). On sallow: *Chalcoides aurea* var. *cyanea* (1). By sweeping: *Dryophilus pusillus* (1, under pine), *Oedemera nobilis* and *O. lurida.* In a chalk quarry: *Homaloplia ruricola* (2). Under bark: *Quedius xanthopus* (1), *Hallomenus binotatus.*

Stratton-on-the-Fosse district, near Bath: 1931–2.—By beating, sweeping, etc.: *Cryptarcha strigata* (1), *Micrurula melanocephala*, *Antherophagus pallens* (1), *Calambus bipustulatus* (under decaying alder), *Selatosomus quercus* and 1 var. *ochropterus*, *Dascillus cervinus* (1), *Helodes marginata*, *Podabrus alpinus*, *Rhagonycha translucida*, *R. testacea*, *Malthinus frontalis* (alder and willow), *M. balteatus* (very locally), *Malthodes guttifer* (not uncommon), *M. dispar*, *M. fuscus* (rare), *M. minimus* var. *marginicollis*, *M. fibulatus*, *M. pumilus* (1), *Dryophilus pusillus* (larch), *Anaspis garneysi*, *Ischnomera coerulea* (2), *Melandrya caraboides* (1 on a rush), *Plateumaris discolor*, *Donacia versicolorea*, *D. vulgaris*, *Chrysolina brunsvicensis*, *Phytodecta viminalis* (sallow), *Plagiodera versicolora* (willow), *Phyllodecta cavifrons*, *Zeugophora subspinosa* (1) and *Saperda populnea* (aspen), *Orobitis cyaneus* (1, alder), *Orchestes avellanae*, *ilicis*, *salicis*, *rusci*, *stigma*, etc., *Thryogenes festucae* (on *Equisetum*), *Allodactylus affinis* (common on *Geranium*), *Otiorrhynchus clavipes* (rather common; also the var. *fuscipes*), *Liophloeus tessellatus*, *Rhynchites interpunctatus* (1 on oak), *R. tomentosus* (2 on sallow), *R. mannerheimi* (on birch), *Apion punctigerum*, *A. spencei* and *Bruchus atomarius* (1, on *Lathyrus*), *Apion scutellare* (furze). In moss, etc.: *Pterostichus gracilis*, *Lebia chlorocephala* (2), *Badister sodalis* (under stones in spring), *Philonthus decorus*, *Stenus circularis*, *S. exiguus*, *S. picipennis*, *Coryphium angusticolle* (1), *Choleva fagniezi* (1), *Neuraphes angulatus* (1), *Apion platalea*, *Omias mollinus*. In stagnant water: *Hygrobia tarda* (in one pond only, in spring), *Noterus clavicornis* De G., *Bidessus geminus*, *Hygrotus confluens*, *Rhantus punctatus* (1). In running water: *Hydroporus ferrugineus* (a few under stones in very shallow water), *Graptodytes sanmarki*. Under stones in stream: *Cryptohypnus maritimus*, *Helmis mangei*, *Riolus subviolaceus*, *R. cupreus*, *Latelmis volkmari*. In dung: *Aphodius constans*, *A. sticticus*, *A. obliteratus* (the latter abundant in autumn). Under bark: *Quedius fulgidus*, *Q. maurus*, *Rhizophagus dispar*, *Agathidium nigripenne* (1 under elm bark), *Cyphon variabilis* (hibernating in numbers under beech bark), *Tetratoma ancora* (2), *Orchesia undulata*, *Rhinosimus ruficollis*, *R. viridipennis*, *Cis bidentatus*, *C. nitidus*, *C. pygmaeus*, *Ennearthron cornutum*. Under pine bark: *Hylastes attenuatus*, *Hylurgops palliatus*. Under bark and in black fungus (*Sphaeria*) on old ash stump: *Cryptophagus ruficornis*, *Mycetophagus atomarius*, *Litargus bifasciatus*, *Diphyllus lunatus* (1 without a trace of the usual white patch), *Cerylon ferrugineum*, *Platyrrhinus resinosus* (2, 1 dead, and larvae in *Sphaeria*).

Dartmoor, Devon: August, 1933.—Running water: *Hydroporus discretus*, *H. celatus*, *H. obscurus*, *H. lepidus*, *Silpha tristis* (1 on red clover), *Choleva glauca* (1 in haystack refuse), *Corticaria crenicollis* (by beating), *Onthophagus fracticornis* (1), *Aphodius depressus* (common, black form only), *Philonthus ventralis* (1), *P. umbratilis*, *P. puella*, *Othius melanocephalus* (rather common under stones), *Phyllobrotica quadrimaculata* (1 in a ditch), *Longitarsus holsaticus*, *Mantura chrysanthemi* (1 at roots of heather and 1 in haystack refuse), *Apion cruentatum*, *A. spencei*, *Larinus planus* (1), *Pissodes pini* (1).

Teignmouth, S. Devon: August, 1933.—*Astenus filiformis* (1), *Stenus picipennis*, *S. guttula*, *Quedius umbrinus* (1), *Apion hookeri* (common on flowers of *Matricaria*).

Tenby, S. Wales: August, 1934.—On the sandhills, at roots of grass, etc.—*Harpalus anxius* (common), *Calathus mollis*, *C. erratus*, *Broscus cephalotes* (common), *Amara tibialis* (rare), *A. lucida* (1), *Liodes dubia* (2), *Pachylopus maritimus*, *Saprinus rugifrons* (1), *Silpha tristis*, *Helophorus porculus* (1), *Anomala aenea*, *Onthophagus fracticornis*, *Cardiophorus asellus* and *C. equiseti* (a dead specimen of each), *Cteniopus sulphureus* (flowers, etc.), *Phylan gibbus* (common), *Melanimon tibiale, Cylindronotus pallidus* (very variable in size), *Otiorrhynchus atroapterus, Cneorrhinus plagiatus* (1), *Sitones griseus* (common), *Tychius schneideri* (1). Under stones, etc., on beech: *Harpalus rubripes* (1), *Staphylinus compressus, S. ater, Quedius semiaeneus* (1), *Stenus crassus* (1), *Phaleria cadaverina* (rare). Under seaweed: *Cafius fucicola* (1), *Cercyon litoralis* and one var. *binotatus*. Inland marshes: *Oodes helopioides, Stenolophus mixtus* (common in one spot), *Stenus formicetorum* (1), *S. pallitarsis* (1), *S. canaliculatus, Euaesthetus ruficapillus* (2), *Paederus riparius* (common), *Copelatus ruficollis* (1), *Heterocerus fenestratus* (1), *Anisosticta 19-punctata* (ground colour generally red instead of yellow, some specimens much suffused with black), *Psammoecus bipunctatus* (2), *Bryaxis longicornis, Bythinus curtisi* (1), *Notaris scirpi* (2).

Freshwater West, near Milford Haven: August, 1934.—*Eurynebria complanata* (in plenty under stones on the beach locally), *Cylindronotus pallidus, Apion atomarium* (1), *Otiorrhynchus ligneus* (abundant under stones, with *Phytonomus variabilis*).—A. A. Allen, The Tiled House, 63 Blackheath Park, S.E.3: *January 6th*, 1935.

*Tapinotus sellatus F. in Surrey.*—On May 29th of last year I took, by sweeping *Lysimachia*, four specimens of this weevil near Pirbright, Surrey. The capture seems to have some special significance in view of Mr. Bedwell's find of the species at Fleet, recorded in this Magazine, December, 1932, and August, 1933. Though in different shires, the two localities are only about nine miles apart in a straight line. My specimens were all of the ordinary form.—J. W Allen, Beech Hurst, Camberley. *February 6th*, 1935.

*A Note on the Ant Camponotus (Tanaemyrmex) maculatus F. in Gum Acacia.*—During November of this year a large number of specimens (workers and soldiers) of the ant *Camponotus (Tanaemyrmex) maculatus* F. were found in a consignment of Niger gum (Gum Acacia) which had been landed at a London wharf. The gum, which was exported from the west coast of Africa at the end of October, had been about three weeks on the voyage to London When the wooden cases were opened for examination, the gum was found to be literally swarming with ants, all of which appeared to be in a very lively condition. There does not seem to be any record of this species occurring in Britain in the 1927 edition of Donisthorpe's 'British Ants.' For the identification of the specimens I am greatly indebted to Mr. H. St. J. K. Donisthorpe. —John M. Nicol, B.Sc. (For.), British Association of Research, 2 and 4 Dalmeny Avenue, Holloway, N.7: *December*, 1934.

*Notes on Plant Galls.*—The meeting of the Plant Galls Section of the London Natural History Society on November 27th was marked by some interesting records of species found shortly before and of insects bred out.

Mr. Niblett showed galls of *Andricus xanthopsis* Schl. he had found in Surrey, and the flies he had bred out from them, a species of which only one previous record for Britain seems to exist, that of Bagnall and Harrison from Northumberland (Vasculum, July 1919), and galls and flies of *A. amenti* Gir., another species with only a few British records (Entomologist, November 1932), and also galled Oak buds thought to be due to *Neuroterus punctatus* Cam., an obscure species recorded in 'British Phytophagous Hymenoptera' (Cameron, 1893). Mr. Niblett had also bred Cecidomyids from galls on *Achillea Millefolium* L. found at Fetcham, these galls differing considerably from those of *Rhopalomyia millefolii* H. Loew., and a third species of gall-midge from another kind of stem-gall on the same plant.

The finding of galls of *Timaspis sonchi* Stefani, by Dr. R. S. Bagnall and the writer on August 18th near Epsom, was reported. The host plant in this instance was *Sonchus arvensis* L., the previous record for this Cynipid for Britain having been in connection with *Sonchus asper* Hill. *Chlorops cingulata* Meigen on *Brachypodium sylvaticum* Roem. & Schult. was recorded from Ranmore Common Woods, the third locality in Britain, and the unidentified Cecidomyid on *Erigeron acre* L. from near Tattenham Corner and Fetcham Downs. Various other species were recorded as having been seen more frequently this last summer than usual such as *Isocolus scabiosae* Gir. on *Centaurea Scabiosa* L. and *Aulacidea pigeoti* Kieff. on *Tragopogon minus* Mill., while further additions were made to the list of Midge galls on British Umbelliferae.—H. J. Burkill, Fetcham, Surrey: *December*, 1934.

## Society.

Entomological Club.—A meeting of the Entomological Club was held at the Junior Carlton Club on December 4th, 1934, Mr. H. Willoughy Ellis in the Chair.

Members present in addition to the Chairman: Mr. H. St. J. K. Donisthorpe, Prof. E. B. Poulton, F.R.S., Mr. Jas. E. Collin, Dr. Harry Eltringham, Mr. W. J. Kaye. Visitors present: Major E. E. Austen, M.C., Mr. H. E. Andrewes, Dr. K. G. Blair, Mr. C. L. Collenette, Mr. H. M. Edelsten, Mr. F. W. Frohawk, Mr. J. C. F. Fryer, Dr. Karl Jordan, F.R.S., Sir Guy A. K. Marshall, C.M.G., F.R.S., Dr. S. A. Neave, O.B.E., Mr. W. Rait Smith, Dr. Hugh Scott, Mr. W. H. T. Tams, Mr. C. J. Wainwright.

The guests were received by the Chairman at 6.30, and a conversazione was held until 7.45, when dinner was served in the large Committee Room on the historic Round Table. After dinner Mr. J. E. Collin exhibited three pairs of a rare British Dipteron (the Asilid *Epitriptus arthriticus* Zeller) captured by him on Breckles Heath, Norfolk, on July 11th this year. This species is known to occur from Southern Sweden down to Austria, but only one specimen had previously been found in this country, which, though taken in 1907 by the late Lord Walsingham near Merton in Norfolk, remained unrecognised until 1932, when Mr. B. M. Hobby found it in the Hope Department at Oxford and published a note on it in the Entomologist's Monthly Magazine for June of that year. The species is evidently still to be found on the sandy heaths of this part of Norfolk, in spite of the changed conditions by afforestation of large areas since 1907.

A long and interesting evening was spent, the guests departing between the hours of 10.30 and 12 o'clock.—J.E.C.

# NEW SPECIES AND FORMS OF AFRICAN LYCAENIDAE (LEP. RHOP.).

BY G. TALBOT, F.R.E.S.

(PLATES I—III.)

This paper is based largely upon the material contained in the Hope Museum at Oxford, and unless otherwise indicated, all types and specimens quoted are in the Hope Department.

Thanks are due to Mr. N. D. Riley for permission to examine the rich collections at the British Museum.

## SUBFAMILY *LIPTENINAE*.

### 1. **Alaena picata connectens** subsp. nov.

This comes near *interrupta* Hkr.-Sm. from Nyasaland, and appears to connect this with *picata*.

♂. Upperside markings more ochreous. Forewing with narrower costal band, which extends into cellule 2 as a small triangular spot or dot. The posterior patch is shorter and narrower, and toothed on its outer edge, sometimes in *interrupta* with a nick on this edge. Hindwing with the outer edge of the band less sharply defined than the inner edge.

Underside with the silvery spots as in *picata*, and not as in *interrupta*. The blackish mark at the upper angle of cell of hindwing is here minute or absent.

♀. Upperside as in *picata*. Underside with the marginal spots larger than in the two allied forms, especially the spot in cellule 2 of the forewing.

*Hab.*—KENYA: Wusi, about 16-20 miles west of Voi, open and hilly country, about 4,000 ft., 15.vi.1925 (*K. St. A. Rogers*), 3 ♂♂, 1 ♀ (types); id., 13.vi.1925, 1 ♂, 1 ♀; id., 28.ii.1923, 2 ♀♀.

### 2. **Alaena kagera** sp. nov.

(Pl. I, Fig. 1; and Pl. III, Fig. 2.)

This species appears to be allied to *reticulata* Butl. and to *caissa* Rog.

♂. Upperside resembles *ferrulineata* Hkr.-Sm., but there are white spots in the cell of the hindwing. Forewing more narrow and more pointed at the apex than in *reticulata*. The white post-discal band is posteriorly broader, the lower part forming a white stripe extending to the base of 1*c*, the three cell-spots and the subapical spot in 6 much larger. The hindwing post-discal band is as in *caissa*, with the spots in 4 and 5 forming a square patch. Cell with two rounded white spots which are absent in the allied forms, and a white stripe below the cell in 1*c*.

Underside markings closer together than in *reticulata*, and more as in *caissa*, differing from this chiefly in the narrower post-discal band of white spots on both wings. Forewing with white cell-spots as on upperside; the white post-discal band is posteriorly wider, and is separated from a distal white marginal area by a curved line of black ground-colour. The hindwing pattern is divided into a proximal and a distal area by the post-discal band, which is here the same as above. The proximal area contains a number of white spots of irregular shape and size as follows: Cellule 8 is white, broken by the ground-colour into a costal stripe and two basal spots. Cellule 7 with three large spots. The cell with three spots including a large one at its end. Cellule 1*c* with two spots, the basal one triangular; cellule 1*b* with one spot, and cellule 1*a* is white. The spots mentioned are in addition to those composing the post-discal band. A submarginal band of six white, somewhat square spots of nearly equal size, separated from the post-discal band by a thin line of black. A marginal band of six similar spots separated from the submarginal band by a thin line of black.

Expanse, 27 mm.; length of forewing, 15 mm.

*Hab.*—Hills west of the KAGERA RIVER, 30° 55′ E., 2° 5′ S. A dry grassy hill, 16.vi.1916, dry season, 1 ♂ (*G. D. H. Carpenter*). See Proc. Ent. Soc. Lond. 1916, p. cxxiv; id., 1918, p. cxxxiii.

### 3. *Telipna acraea bimacula* Plötz. ♀ f. **nigrita** f. nov.

Forewing above without a cell-stripe. The median band is reduced proximally and does not touch the cell below vein 2, being sometimes quite separate from the cell.

*Hab.*—CONGO: Haut Congo, Basankusu, Bongandanga, 9.iv.1928, 1 ♀ (type); id., 16.v.1928, 1 ♀; id., 21.viii.1929, 1 ♀; id., 9.vi.1930, 1 ♀. All collected by Miss G. Vinall. Also from S.W. of Upper Kasai River district, 1908, 4 ♀ ♀ (*Paul Landbeck*).

### 4. **Pentila nyasana ras** subsp. nov.

♂ ♀. This is very close to *alberta* Hulst., but some specimens approach *leopardina* Schultze. The black outer border of the forewing is narrower than it is in the two allied forms. In four out of eight specimens the distal tooth of ochreous ground-colour on vein 2 is wider and blunt. The distal black dot in cellule 2 is always present, but the one above it is only faintly marked in most specimens. The underside pattern is not different from most specimens of *alberta* from the Congo and Tanganyika, except that some specimens have more heavily marked spots and thus approach *leopardina* from the Cameroons. The submarginal spots on both wings are more rounded than bar-shaped, except the three anterior ones on the forewing.

*Hab.*—S.W. ABYSSINIA: Got River, 1,700 ft., 7° 42′ N., 34° 36′ E., 15.xi.1925; Pokodi, 1,700 ft., 7° 38′ N., 34° 42′ E., 14.xi.1925, 1 ♂ (type); Elephant Hill, 1,900 ft., 6° 56′ N., 35° 48′ E., 30.x.1925, 3 ♂♂, 2 ♀ ♀ (♀ allotype); Gilo River, 1,800 ft., 7° 22′—7° 20′ N., 34° 55′—35° 1′ E., 8.xi.1925, 3 ♂♂, 2 ♀ ♀; near Leman River, 2,300 ft., 7° 12′ N., 35° 0′ E., 3.xi.1925, 1 ♀; near Akula River, 2,000 ft., 7° 3′—6° 56′ N., 34° 52′—34° 48′ E., 1 ♂, 1 ♀. All collected by Arnold Hodson. Also in the B.M., 1 ♂ from Gibe River, Sayo, 24.iv.1905 (*Ph. C. Zaphiro*). This is a small and but slightly marked specimen.

### 5. *Mimacraea krausei* Dew. f. **viviana** f. nov.

(Pl. I, Fig. 2; and Pl. III, Fig. 3.)

We have applied to this form of the polymorphic *krausei* the name of the *Acraea* to which it bears a close likeness.

♀. Markings above pale ochreous and sharply defined. On the hindwing the ochreous area extends to the base. Underside of hindwing as in the form *masindae* B.-Bkr. and with slight whitish proximal suffusion. Forewing cell H marks brownish-yellow, other markings as above. The distal strigae but weakly marked on both wings.

*Hab.*—UGANDA: Unyoro, Bugoma Forest, 3,700 ft., cool and dense, 1.xii.1911, 1 ♀ (type); id., Budongo Forest, 3,400 ft., 12.xii. 1911, 1 ♀ (*S. A. Neave*). There is also a similar female from the Sese Isles, L. Victoria, taken on Kisigalla Islet, north of Kome Isle, 24.xii.1918 (*G. D. H. Carpenter*). In the B.M. two similarly pale specimens from Unyoro appear to belong to this.

### 6. *Mimacraea krausei* f. **citrifascia** f. nov.

This resembles *poultoni* Neave, but the band of the hindwing is entirely or for the greater part pale yellow. On the forewing the subapical band is of the same red-brown as the discal patch. On the hindwing, below, the proximal area is paler yellow, slightly darker at the base, and with its edge strongly produced on the veins. This latter character, however, may appear in other forms.

*Hab.*—UGANDA: Budongo Forest, August—September, 1934, 1 ♂ (*T. H. E. Jackson*) (type). Also in B.M. from Uganda, but the yellow band with more reddish scaling.

### 7. **Mimacraea krausei elgonae** subsp. nov.

(Pl. I, Fig. 3; and Pl. III, Fig. 5.)

♂. Distinguished by the band on the forewing being broader and connected on vein 2 with the subapical band. Both bands are deep ochreous. The band on the hindwing is pale ochreous or yellow ochreous, surrounded by deep ochreous. It extends farther into the cell than is usual in other forms and frequently reaches the base.

♀. Resembles the ♂, but on the forewing the connection at vein 4 is not always complete. Band of the hindwing usually reaching the base, paler in the middle than in the ♂, and posteriorly white or pale yellow.

This race is not entirely constant, and narrow-banded specimens occur in a minority.

*Hab.*—UGANDA: Elgon to Unyoro. Elgon, north-west, 3,600 feet, strip about 500 yards by 50 yards, dense forest by the Siroko River, 13.viii.1911, 10 ♂♂, 10 ♀♀ (*S. A. Neave*) (types). Also both types in the B.M. labelled as above and dated 12, 13, and 14 viii.1911, including ♂ ♀ taken 'in cop.' 13.viii; also at 3,500 ft. in Unyoro on the Kafu River, near Kampala-Hoima Road, scrub with semi-forest patches on the river, 31.xii.1911, 1 ♂ (*S. A. Neave*).

### 8. *Teriomima minima* Hkr.-Sm. f. **stygia** f. nov.

(Pl. I, Fig. 4.)

♂. Larger than *minima*, size of *freya* S. & K. Upperside with reduced ochreous markings. Forewing with the posterior stripe not reaching above vein 2 and not extended to the base. The band of the hindwing only represented below the cell and vein 2 by a few scattered scales.

Underside markings thinner on the hindwing, but strongly defined on both wings by the extended blackish ground-colour, which invades the costal area of the forewing and renders the hindwing darker, as in *freya*, but with much smaller markings.

*Hab.* —KENYA: Rabai, 700 ft., 14 miles north-west of Mombasa, 21.xii.1909, 3 ♂♂ (*K. St. A. Rogers*).

### 9. **Liptena hapale** sp. nov.

(Pl. I, Fig. 5.)

Allied to *decipiens* Kby.

♀. Resembles a white *Terias*. Upperside white. Forewing with large black apical area. This area reaches the middle of costa and posteriorly is limited by the fold in cellule 2, where it is 2 mm. wide; its inner edge is slightly incurved between veins 3 and 5. The costal border is dusted slightly with black, more so at the base. Hindwing unmarked.

Underside entirely without markings.

Expanse, 31 mm.; length of forewing, 17 mm.

*Hab.*—UGANDA: Budongo Forest, August—September, 1934, 1 ♀ (*T. H. E. Jackson*).

### 10. **Liptena flavicans oniens** subsp. nov.

(Pl. I, Fig. 6.)

♂ ♀. Upperside apparently not different from typical *flavicans* S. & K., except for the very narrow costal black along the proximal half of the forewing which sometimes occurs in Cameroons specimens. Hindwing with heavier pale transverse stripes. The yellow distal clear area larger and especially extended distad in 4 and 5, with a somewhat square-shaped patch of fuscous ground-colour placed near the middle of costa. The two submarginal lines are more crenulate than in the typical form.

*Hab.*—LAGOS DISTRICT: 70 miles east of Lagos in forest 1 mile east of Oni, 10.iii.1812, 1 ♂ (type); id., 19.iii.1912, 1 ♀; id., 25.ii.1912, 1 ♀. Dry season 8.xii.1911 to 23.iii.1912. All collected by W. A. Lamborn.

### 11. **Liptena o-rubrum** Holl. **teroana** subsp. nov.

This is the Uganda race, distinguished by the pale costal spot and less red on the hind-wing below, and by the red cell-spot of the ♀.

♂. Upperside as in typical form. Underside with the pale areas and markings much more accentuated. The discal spot red, but the other proximal spots black or with only faint traces of red. Hindwing and outer marginal area of forewing much paler than in the typical form.

♀. Upperside with a red spot in the cell near the end, and with some red scaling along the lower margin of cell. Hindwing with the red discal spot obsolete.

Underside paler than in the typical form, with red in the cell of forewing more or less marked. Hindwing as in the ♂, but with a reddish tinge.

*Hab.*—UGANDA : About 30 miles west of Victoria Nyanza, S.E. Buddu, thick forest, 1° 10′ S., 31° 30′ E., near Kakindu Hill, 27.vi.1915 (*G. D. H. Carpenter*), 1 ♂ (type), and 3 others, 13.vii, 14.vii, 30.x.1915; id., 25.iv.1915, 1 ♀. Also in the B.M. from Tero Forest, S.E. Buddu, 3,800 ft., 26-30.ix.1911, 10 ♂♂, 2 ♀♀.

### 12. **Eresina bilinea** sp. nov.

(Pl. I, Fig. 8.)

♀. Upperside similar to *gerda* S. & K., and with similar ochreous ground-colour, but also with black outer border and black costal marks as in a *Teriomima*. In this species vein 10 arises from apex of the cell. Forewing with a black outer border extending from the costa at end of vein 10 to the submedian, and becoming broader above vein 4. Costal margin strongly dusted with black. A black triangular patch between the cell and apical area. A black disocellular mark. A small black spot in the cell above vein 2. The basal half of cell and below it to the inner margin dusted with black. Hind-wing with the outer margin strongly dusted with black to vein 6, and below vein 3 this black scaling extends to the cell and base. Cellule *1a* grey-brown with darker speckling. Fringes white, broadly black at the veins.

Underside of forewing as above, but paler, the black areas strongly irrorated with grey. Hindwing grey, strongly irrorated with black, which forms certain definite markings. These comprise a heavy and irregular discal line which, near the costa, is much thicker and is forked, enclosing a pale costal spot. A similarly irregular submarginal line, not distinct above vein 4. The space between the two lines is paler than the rest of the wing, and anteriorly is much broader than posteriorly. In cellule 7 is a small rounded blackish sub-basal spot, and a similar spot below the cell, both not very distinct.

Head, palpi and legs as in *gerda*. Abdomen missing.

Expanse, 29 mm.; length of forewing, 14 mm.

*Hab.*—KENYA : Kavirondo, Kakamega, 25.vi.1931, 1 ♀ (*T. H. E. Jackson*).

### 13. **Eresina erola** sp. nov.

(Pl. I, Fig. 7; and Pl. III, Fig. 1.)

The upperside of this species resembles *toroensis* J. and T., and the underside resembles *corynetes* Sm.

♀. On the forewing above the ochraceous area does not reach the base. It touches the cell below vein 2, above this it is incurved on its proximal edge, and just beyond the cell to vein 6 it forms a narrow projection, becoming anteriorly incurved, and on its outer edge excurved. There is a rounded blackish spot situated near the cell below vein 2. The hindwing much resembles *toroensis*, the dark outer border being a little narrower.

Underside without the small spots of *toroensis*, but with patches and irroration somewhat as in *corynetes*. Forewing mostly pale ochreous. A large black subapical somewhat triangular costal patch reaching vein 4, with a small spot below it in 3. Proximal area slightly irrorated with black. Outer marginal area strongly irrorated with black, with also a few submarginal spots from the costa to cellule 3, placed nearer the costal patch than to the margin. Hindwing ground-colour ochreous-grey, as in *corynetes*, with a broad blackish discal band and dark outer border. The discal band shows a very indistinct proximal edge, but is sharply defined distally. Between vein 4 and the costa it forms a somewhat square patch, broken on the costa by a small pale spot of ground-colour. There is a small blackish sub-basal spot below the cell, and another below the origin of vein 2. There is a dark outer border, paler, however, than the discal band, and showing an indistinct series of pale submarginal spots.

Outer margin of the wings not crenulate as in *corynetes*. Fringes fuscous, with only a trace of white between the veins. Head, palpi and legs as in *toroensis*.

Expanse, 24 mm.; length of forewing, 12 mm.

*Hab.*—S.W. UGANDA: Kigezi district. In forest strip near mouth of Ntungwe River, Lake Edward, 19-24.ix.1922, 3.200 ft., 1 ♀ (*G. D. H. Carpenter*).

### 14. **Deloneura ochrascens littoralis** subsp. nov.

♂. Forewing above with the costal black more extended towards the base. The outer edge of the ochraceous area is nearly regular, and a little behind it on the costal margin is a small spot which does not occur in the typical form.

Underside of forewing with the costal edge of the ochraceous area irregular. The patch in cellule 6 is larger than in the typical form, and there is a small spot above it, as on the upperside; a blackish spot divides this patch from the ochraceous basal part of cellule 6. The costal border is wider and bears larger yellow dots. Hindwing with the spots ochraceous and a trifle larger than in the typical form. Ground-colour with a paler grey irroration. Two submarginal rows of grey marks and a thin grey submarginal line.

♀. Resembles the ♂, but is paler above. Underside with a purplish-grey ground.

*Hab.*—KENYA: Mombasa district, Gallana, about 100—200 ft, north of Sabaki River, about 80 miles from Rabai, 16.viii.1911, ♂ ♀, with 4 other males on the same tree (*K. St. A. Rogers*) (types). Also 2 ♂♂ and 3 ♀♀ taken by the same captor at or near Rabai between August, 1908, and October 21st, 1911. Also in the B.M. from Witsu, May, 1891, 1 ♂ (*F. J. Jackson*).

### 15. **Iridana perdita marina** subsp. nov.

♂. Blue markings above are deeper in colour, more indigo. Forewing with shorter blue stripes, these being distally reduced, especially the one on the inner margin. Hindwing with much smaller blue area, formed of three short post-cellular stripes in 2—4, reaching to the base of the cellules, the one in 2 being the longer, the one in 4 being very narrow.

Underside markings and colouring as in *perdita* Kby. Forewing with distinct grey-white discal spot. The three lower post-discal spots are placed farther from the margin than in *perdita*, the one in 3 minute but distinct, the one in 2 oblong, the one below it about the same size and obovate, these two spots much larger than in *perdita*. Hindwing discal band as in *perdita*. The proximal area, with a greyish sheen, extends just beyond the discal band, whereas in *perdita* it reaches to about midway between the band and the margin. Marginal markings as in *perdita*.

Expanse, 29 mm., being a little larger than the *perdita* type.

*Hab.*—UGANDA: Bunyoro, Budongo Forest, Aug.-Sept., 1934 (*T. H. E. Jackson*).

### 16. **Epitola miranda vidua** subsp. nov.

♀. Upperside markings pale ochraceous, the subapical spots larger, the band attaining a width of about 6 mm. in the type specimen. In *1b*, nearer the margin than to the cell, is a small rounded spot and indications of a pale stripe in this cellule. The spot mentioned occurs in the typical form, but in the Uganda race it is much larger and extends to the margin. On the hindwing the differences are slight. The basal spots appear to be variable. The post-discal grey-white marks are more distinct.

*Hab.*—UGANDA: Sese Islands, Lutoboka, east of Bugalla, about 3,700 ft., at the forest edge, 1.xi.1912, 1 ♀ (*G. D. H. Carpenter*) (type). Also in B.M. from Victoria Nyanza, west shore, Buddu, 3,700 ft., 19-25.ix.1911, 1 ♀ (*S. A. Neave*); Siroko River, near west foot of Mt. Elgon, 3,600 ft., 12-14.viii.1911, 1 ♀ (*S. A. Neave*).

### 17. **Epitola staudingeri mara** subsp. nov.

♂. Upperside of forewing with reduced blue area. The blackish discal patch reaches the cell between veins 4 and 5. The whole of vein 2 is black, and this cuts off a small blue submarginal spot in 2. The lower margin of the cell is black. A black bar connects the discal patch with the costal border, cutting off a subapical band of three short stripes. Hindwing as in the typical form.

Underside a little darker than in the typical form, but the indistinct markings are similar. The faint band on the hind-wing formed by the two post-discal lines is perhaps a little wider in this form.

*Hab.*—UGANDA: West of Victoria Nyanza, 1° 10′ S., 31° 30′ E. Thick forest near Kakindu Hill, 13.iii.1915, 1 ♂ (*G. D. H. Carpenter*) (type).

### 18. **Epitola vinalli** sp. nov.

♂. Allied to *pinodoides* S. & K. and to *rezia* S. & K. Agrees with the former in having no blue cell-spot on the forewing, and with both in having a series of small post-discal spots, none of which touch the cell. Compared with *rezia* the blue colour is much darker, the post-discal spots are smaller, and there is no spot in area 3. In area *1b* there is a narrow stripe; above this at its distal end in *2* is a small, somewhat square spot, and in 4—6 are three minute spots placed more obliquely than in *rezia*. These markings form almost a semi-circular blue line, and the enclosed area appears to be differently scaled and shows a dull sheen. The base of the submedian is more swollen than in *rezia*, and for a shorter distance. Hindwing as in *rezia*, but without heavy black scaling on the veins.

Underside with the pattern of the group. The black area on forewing as in *rezia*, but anteriorly reduced and ill-defined, not extended above vein 5. Inner margin grey. An indistinct grey post-discal spot in 2, and a post-discal dot in 4.

Submarginal grey spots as in *resia*, but very small and indistinct. Hindwing ground-colour as in *pinodes* Druce. Markings very indistinct and different to *resia*. No marks in the proximal area. A post-discal band, outlined by small spots of paler ground-colour, runs parallel to the margin.

Expanse, 32 mm.; length of forewing, 16 mm.

*Hab.*—BELGIAN CONGO: Basankusu, 40 miles west of Bongandanga, Baolongo, 20.vi.1929, 1 ♂ (type); id., Ngando, 60 miles west of Bongandanga, 24.vi.1929, 1 ♂. Both collected by Miss Gertrude Vinall, who has sent much valuable material to the Hope Department, and to whom we have much pleasure in dedicating the species.

## SUBFAMILY *LYCAENINAE*.

### 19. **Lachnocnema disrupta** sp. nov.

(Pl. I, Figs. 9 and 10; Pl. III, Fig. 4.)

Distinguished from other species by the discal band of the hind-wing below being fractured at vein 6, cutting off a square distal costal patch.

♂. Upperside brown, as in *bibulus* F. and *brimo* Ksch., with indistinct dark discocellular spots.

Underside of forewing resembling *brimo*. A narrow discocellular mark, beyond which in 4 and 5 is a pale patch as in *brimo*, but longer and as prominent as in *brimo* ♀. Beyond this patch are three dark spots as in *brimo*, and obliquely placed. Between these spots and the margin is a dark marginal patch, which also occurs in *brimo*, but is only weakly developed in that species. Hindwing with discal band as above-mentioned, the costal patch placed at right-angles to the costa. Other markings as in *brimo*.

♀. Upperside white with fuscous borders, resembling a large *exigua* Holl. Forewing white area extends from base to beyond cell, into lower part of cell, anteriorly to vein 6, and posteriorly to the inner margin. Outer marginal border 2—3 mm. wide, costal border about 2 mm., extending over most of the cell and forming also a small discocellular bar. Hindwing outer border about 2 mm. wide. Costal border and cell to the base white mixed with fuscous.

Underside with white ground-colour and markings much as in the ♂. Forewing with cell and costal border to vein 6 fuscous, distal margin slightly darkened. The three post-discal spots are placed parallel to the margin, and not obliquely as in the ♂. Hindwing with the costal patch more widely separated from the discal band than in the ♂, the discal band being distally reduced. The distal border of white and fuscous irroration reaches from vein 1*b*—6.

Expanse, ♂ 28 mm., ♀ 27 mm.; length of forewing, 14 mm., 15 mm.

*Hab.*—S.W. UGANDA: Kigezi district, Ruanda country, Chahafi, floor of Rift Valley, ca. 6,500 ft., 7.ix.1921, 1 ♂ (*G. D. H. Carpenter*) (type). N.E. RHODESIA: Lake Chambezi Valley, Kasama district, 3,900 ft., 7.v.1908, 1 ♀ (*S. A. Neave*).

### 20. **Hypokopelates anetia anetta** subsp. nov.

(Pl. I, Fig. 12.)

The western race of *anetia* Hulst. 1924.

♂. Compared with a specimen from Uganda which differs slightly from the typical form. Upperside with more extended blue on the forewing, leaving black the costal border and a small apical patch limited to vein 6.

Underside of forewing as in the typical form and darker than the Uganda one. The post-discal band of the hindwing is fractured at vein 4, and is thinner and less strongly marked than in the Uganda specimen.

Expanse, 30 mm., as compared with 27 mm. in the *anetia* type and 24 mm. in the Uganda specimen.

*Hab.*—LAGOS: Olokemeji, 90 miles north of Lagos, 277 ft., Jan., 1911, 1 ♂ (*L. S. Noble*).

### 21. *Hypokopelates otraeda* Hew. ♀.

(Pl. I, Fig. 11.)

The ♀ of this well-known species appears to be undescribed, and two forms of it exist.

The blue form seems more usual, and we take this as typical. Upperside fuscous-brown with pale blue areas on both wings. On the forewing the proximal half is blue, reaching end of cell, the spot in base of area 2 very small. Hindwing with broad fuscous costal and outer border, becoming narrow below vein 3. A fine white antemarginal line from 1*b*—6. On the forewing is sometimes a trace of white on the outer edge of the blue.

In the Hope Museum, from Congo: Basankusu, Bongandanga, 13.iii.1929 (*Miss G. Vinall*) (neallotype); id., 7.iii.1929, one; id., 29.iii.1929, one. Also in the B.M. from Sierra Leone: Njala, x, xi, xii (*F. Hargreaves*), 3; one without locality, ex coll. Crowley.

### ♀ f. **modesta** f. nov.

Upperside pale fuscous-brown. Forewing without markings. Hindwing with a bluish-grey posterior patch formed of short stripes in areas 1*c*, 2—4, the one in 2 being the longer and also distally greyer, defining a dark marginal spot. The antemarginal white line as in typical form. On the underside the outer border of both wings is less darkened than in the typical form.

In the Hope Museum from Lagos district, half-mile east of Oni, 2.iv.1911, wet season (*W. A. Lamborn*) (type); id., 22.v, 27.v.1910, wet season, two; id., 22.xii.1910, dry season, one. Also in B.M. from Gold Coast, iii.1906 (*G. C. Dudgeon*), one.

### 23. **Hypokopelates eleala ugandae** subsp. nov.

This is allied to the race *ituri* B.-B.

♂. Upperside as in *ituri*. Underside with only slight clouding over the outer margin of both wings. The discal stripe is thinner and straighter than in *ituri*.

♀. Forewing above with blue proximal half. The outer edge of the blue area is oblique from a little beyond upper angle of cell to within 2 or 3 mm. of the tornus. Distal area and costal margin fuscous. Hindwing blue, with fuscous costal border. Outer marginal border fuscous and of variable width to the lobe. Anal lobe orange, with black marginal patch.

Underside as in the ♂.

The upperside closely resembles a specimen of *ituri* in the B.M. from the Cameroons.

*Hab.*—UGANDA: Victoria Nyanza, S.E. Buddu, near Kakindu Hill, 25.ii.1915, 1 ♂; 5.viii.1915, 1 ♂ (*G. D. H. Carpenter*); id., 1.vii.1915, 1 ♀; Jinja, 8.vii.1921, 1 ♂ (*V. G. L. Van Someren*) (type). Also in B.M. from Entebbe, 12-20.i.1912, 1 ♂ (*S. A. Neave*); Tero Forest, S.E. Buddu, 3,800 ft., 26-30.ix.1911, 1 ♀ (*S. A. Neave*); west shore of Victoria Nyanza, Buddu, 3,700 ft., 19-25.ix.1911, 1 ♀ (*S. A. Neave*) (♀ allotype).

### 24. **Myrina subornata nuba** subsp. nov.

♂. Upperside with slightly more extended blue on both wings.

Underside with the hindwing markings not black, but of a deeper brown than the ground-colour. Anal area with the spot paler red and with increased white scaling.

♀. Compared with two specimens from the Gold Coast. Both of these are fuscous-brown, without markings on the forewing. One is without blue on the hindwing, and the other has a small blue spot in 2 with slight blue scaling above and below it.

The Sudan ♀ has on the hindwing a blue dot in 1c near the margin, and above this a few scattered blue scales in cellule 2.

Underside markings of hindwing coloured as in the ♂. The post-discal line continued above vein 6 by a bar in 6 and a spot in 7. A discocellular mark which is absent in the Gold Coast females. Anal lobe dark red irrorated with black.

*Hab.*—SUDAN: Nuba Mtns. Province, Dilling district, 6 miles south-west of H.Q., north Nyima Range, 31.xii.1917 (*J. Nill*) (♂ ♀ types); id., 1917-18, 7 ♂♂, 3 ♀♀. All presented to the Hope Department by Lt.-Col. R. S. Wilson.

### 25. **Myrina dermaptera nyasae** subsp. nov.

A slightly differentiated race.

♂. Blue area of forewing extended nearer the tornus. The spot in 6 of the hindwing larger.

♀. Forewing with extensive blue area as in some Natal specimens. Hindwing with more extended blue between veins 2 and 5.

*Hab.*—NYASALAND: Fort Johnson, 23.vi.1926, ♂ ♀ (*W. A. Lamborn*). Also from Fort Johnston, 23-27.vi.1926, 5 ♂♂, 4 ♀♀; Dowa, Nyasaland, 18° 37′ S., 39° 55′ E., 14-18.viii.1919, 3 ♂♂, and Rua River, 8 miles north of Kota Kota, Nyasaland, 6.vi.1927, 1 ♀, all by the same captor.

(*To be continued.*)

*Further records of Anthicus tobias Mars.*—Since my note in the February number of this Magazine (*antea*, p. 41) on the occurrence of the above beetle in Britain, I was much interested to receive a postcard from Dr. A. Reclaire, of Hilversum, stating that 'In September, 1933, I found this species on the wall of a cottage at Bemelen, near Maastricht, Holland. The species is also recorded from the vicinity of Cologne. I also believe that it has been introduced.'—E. C. BEDWELL, 54 Brighton Road, Coulsdon: *March 13th, 1935*.

# SOME PASSALIDAE IN THE COLLECTION OF THE BERLIN ENTOMOLOGICAL MUSEUM.

BY JOHN R. DIBB, F.R.E.S.

The material mentioned below consists of a small collection of Passalidae sent for identification by the authorities of the Deutsches Entomologisches Institut, Berlin, to whom I wish to express my thanks for the opportunity given to me to examine the specimens. I am also indebted to my friend Mr. W. D. Hincks for assistance with the determinations.

With the exception of four examples the whole of the material is from the region of New Guinea and Australia, and the full particulars of locality and other data have been included in order to supplement the comparatively few authentic records already published. Of special interest is the first record of *Gonatas pumilio* Kaup from Australia.

## AULACOCYCLINAE.

*Aulacocyclus deyrollei* Kaup. Thirteen examples, Ballarat District, Victoria (*Coll. Kraatz*). Some fifty examples of this species from various collections have passed through my hands during the last three years, all of which come from the above locality, where it is apparently abundant. It has also been recorded from Queensland.

## MACROLININAE.

*Pelopides burmeisteri* Kaup. A single example of this fine species labelled Padang, Pandiang (Sumatra), 770M., vi.1921, leg. E. Jacobson (*Pelopides burmeisteri* (Kaup) det. Gravely). This species is of fairly frequent occurrence in Sumatra, Java and Borneo.

*Analaches australiensis* Stol. Three examples from Australia labelled: —(2) Cairns 7/05 (*Coll. Hacker*), (1) Cairns 12/04, 64 (*Coll. Hacker*). The previous records are from New Guinea and Australia.

*Analaches puberilis* Kuwert. Five examples: —(3) D. Neu Guinea (*Wahnes*) (*Franklin Müller*), (2) N. Guinea, Sattelberg (*v. Bennigsen*) (*Coll. Bennigsen*). Apparently an abundant and variable species in New Guinea. In addition to *puberilis* Kuwert three other forms were described as distinct species, but we now consider them all to be forms of the vigorous species *puberilis*.

*Cetejus halmaheirae* Kaup (?). Two examples, D.N. Guinea, Kani Geb. (*Coll. Bennigsen*); 1 example, Neuguinea, Kani Geb. (*v. Bennigsen*) (*Coll. Bennigsen*).

*Cetejus* spp. (?). One example, N. Guinea, Sattelberg (*v. Bennigsen*) (*Coll. Bennigsen*); 1 example, Bismark Archipel. (*Coll. Kraatz*). These two specimens have the mandibles and tubercles and ridges of the head much worn, making identification uncertain at the present stage of our incomplete knowledge of the species of the genus *Cetejus*.

*Cetejus brachymetopus* Zang. One example, D. Neu-Guinea (*Wahnes*) (*Franklin Müller*). Originally described from Amboina and subsequently recorded by Heller from New Guinea, which appear to be the only records for the species. We can refer to a further example in Coll. Hincks & Dibb from Finchhafen, D.N. Guinea.

*Labienus compergus* Boisd. One example, D. New Guinea (*Wahnes*) (*Franklin Müller*). A well-known species in New Guinea and the surrounding islands.

*Labienus ptox* Kaup. Nine examples from New Guinea: —(3) D. Neuguinea (*Wahnes*) (*Coll. F. Müller*), (2) Stephansort, D. N. Guinea (*Coll. Kraatz*), (1) D. Neuguinea, Sattelberg (*leg. C. Wahnes*) (*Coll. F. Müller*), (1) Bongu, Dtsch. N. Guin. (*ex Coll. F. Schneider*) (*Coll. Kraatz*) (*impunctatus*), (1) Stephansort (*L. ptox* Kp.) (*Asien*), (1) Dtsch. N. Guinea. The series is practically of uniform development. *L. ptox* occurs abundantly in New Guinea and the neighbouring islands. It is the commonest species of the genus. Two early records of its occurrence in Sumatra and Borneo have not subsequently been confirmed.

*Labienus trigonophorus* Zang. Seven examples, D. N. Guinea (*C. Wahnes*) (*Coll. Franklin Müller*). So far as at present known this species is confined to New Guinea, where it is fairly abundant.

*Protomocoelus australis* Boisd. Five examples as follows:—(2) Coen Distr., Cape York, Queensland (*H. Hacker*) (*Coll. Hacker*), (1) Herbertshöhe (*Coll. Kraatz*) (N.G.), (1) Salomons Ins., Kieta (*v. Bennigsen*), (1) Bismark Archipel. (*Coll. Kraatz*). This range of examples covers, with the exception of the island of Ceram, the whole known distribution of this common and variable species.

*Protomocoelus sternbergi* Zang. Four examples, D. Neu-Guinea (*Wahnes*) (*Franklin Müller*). This appears to be a common species in New Guinea and the surrounding islands judging from the large number of specimens we have seen. It is a variable species and some variation is apparent in the four examples above mentioned.

*Gonatas schellongi* Kuwert. One example, D.N. Guinea (*C. Wahnes*) (*Coll. Franklin Müller*). An abundant and widely distributed species, recorded from Amboina, New Guinea, New Britain and Cape York, Australia.

*Gonatus minimus* Kaup. Three examples from New Guinea as follows: —(2) Herbertshöhe (*Coll. Bennigsen*), (1) Simbang, D.N. Guinea (*Coll. Bennigsen*). A common species in New Guinea, also found in New Britain and the Solomon Islands. A questionable Australian record has not been confirmed.

*Gonatas pumilio* Kaup. One example, Coen Distr., Cape York, Queensland (*H. Hacker*) (*Coll. Hacker*). This specimen provides an important new record, extending the range of the species from the New Guinea group of islands to Queensland, Australia. Other species of the genus *Gonatas* occurring both in New Guinea and Australia are *germari* Kaup, *naviculator* Perch. and *schellongi* Kuwert.

### LEPTAULACINAE.

*Leptaulax dentatus* Fab. Thirty examples as follows: —(26) D. Neu-Guinea (*Wahnes*) (*Franklin Müller*), (2) N. Guinea, Sattelberg (*v. Bennigsen*), (1) D.N. Guinea, Kani Geb. (*Coll. Bennigsen*), (1) Gazellen H. Insel (*Coll. Bennigsen*). One of the most widely distributed and common species extending continuously from the Himalayas via the Malay Peninsula and New Guinea to Australia.

*Leptaulax pulchellus* Arrow. One example, N. Guinea, Sattelberg (*v. Bennigsen*). This species does not appear to be at all common. The previous records are from New Guinea. It is one of the two species of Passalidae which are not entirely black in colour. *L. pulchellus* Arrow and *L. glaber* Kirsch. have the basal halves of the elytra red-brown and the apical halves black.

1 Moorland Grove, Leeds 7.
*January*, 1935.

*The distribution of Gnypeta coerulea Sahlb. in Britain.*—With reference to Mr. J. H. Keys' notes on this subject (*antea*, p. 54), I should like to say that this species occurs in Dovedale, Staffordshire-Derbyshire border. I have taken three on different occasions running on flat blocks of limestone beside and in the R. Dove, and one, I believe, from moss gathered from under, and at the edge of, water flowing over the low weirs in the Dale. Otherwise I have not up to the present found this moss very productive. *Dianous coerulescens* Gyll. and *Helmis maugei* Bed. are fairly plentiful, and I have taken a very small number of the common *Lesteva longelytrata* Goeze and a single *Trogophloeus arcuatus* Steph.—H. W. DALTRY, Bar Hill, Madeley, Crewe: *March 9th*, 1935.

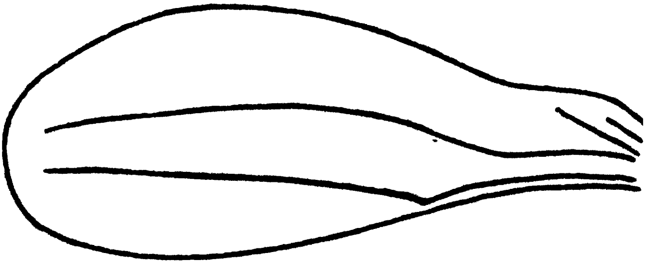
# NOTES ON SOME DIMORPHIC PSOCIDS.

BY J. V. PEARMAN, F.R.E.S.

Intended for incorporation in papers long in preparation and still awaiting completion, the matter in the following notes may be of sufficient interest to deserve separate publication.

### 1. *Embidotroctes rectivenis* Pearman and the genus *Embidopsocus*.

In Hagen's diagnosis of the genus *Embidopsocus* (1865, E.M.M., II, 170), there is a curiously worded phrase to which I referred when describing *Embidotroctes rectivenis* (1925, E.M.M., LXI, 126). It says that the subcosta (=radius), after uniting with the costa, 'is prolonged from that point into a branch divided somewhat obliquely towards the apex.' The sense of the context hints that 'directed somewhat obliquely' might be more appropriate wording. A specimen's of Hagen's writing that I have seen is in Latin cursive, very small, the letter *e* like *i*, and *t* a straight stroke. If one has regard to the probable appearance of the English word 'directed' written in such a hand, the possibility of mistaking it for 'divided' beomes apparent.



*Embidopsocus luteus* Hagen.
Forewing of type. Copy of camera lucida drawing supplied by Mr. Nathan Banks, Harvard Mus. Comp. Zool.

Literal interpretation of the printed passage led Enderlein to believe that the radius in *Embidopsocus* was forked, and to establish the genus *Embidotroctes* for a species in which that vein is simple. In 1929 Mr. Nathan Banks kindly sent me a camera lucida drawing, with permission for its reproduction, of the wing of Hagen's type. The figure shows a simple, unforked radius and a style of venation very like that of Enderlein's species. There is thus not only support for the presumption of the suggested error in transcription, but direct evidence that, as regards the genera at least, *Embidotroctes* must be treated as a synonym of *Embidopsocus*.

However, the synonymy does not end there. As I have previously noted (loc. cit.), the apterous females of *E. rectivenis* could have been assigned to the genus *Stenotroctes* Enderlein. The types from which I worked were mounted in balsam and the details of the genitalia could not well be made out, but it was assumed, in harmony with the known conditions in other sexually dimorphic species of Psocids, that the winged examples were males, and they were so described. Subsequent to publication, Mr. Womersley procured for me a further series of the insects, and when an opportunity was taken to examine these in detail it was found that the wingless forms comprised both females and males, but all the winged ones were females only. Although associations of pairs of Psocid species are not uncommon, the morphological agreements between the winged and wingless forms of the Embidopsocid, particularly the correspondence in chaetotaxy (a feature of proved specific discriminatory value in the group) leaves no doubt that the two forms—which were found together both in Bristol and in London—belong to the sames species. As the apterous examples would, by themselves, be referable to the genus *Stenotroctes,* and actually agree with *S. enderleini* Ribaga 1905, the latter genus also must be considered as synonymous with *Embidopsocus,* and the British species is to be identified with that of Ribaga. Incidentally, I have received specimens of this species from South Africa.

On what is now made known, and judging from the description and figure (1883, Stett. Ent. Zeit., 296; 1882, t.c., fig.), it would seem that Hagen's genus *Tropusia* may not be separable from *Embidopsocus.*

The following summarises the synonymy discussed:—Genera, *Embidopsocus* Hagen 1865 = *Tropusia* Hag. 1883 (?), *Stenotroctes* Enderlein 1905, *Embidotroctes* Endln. 1905. Species, *Embidopsocus (Stenotroctes) enderleini* Ribaga 1905 = *Embidotroctes rectivenis* Pearman 1925.

Whether *E. luteus* Hag. is to be identified with either of the other two species with known winged individuals, or otherwise, could be decided only after examination of the chaetotaxy of Hagen's types or of other specimens from Cuba.

### 2. *Psoquilla marginepunctata* Hagen.

This species occurs in two forms, one with all four wings fully developed, the other with reduced forewings and vestigial hindwings. As in the case of *Embidopsocus enderleini* (Rib.) [*Embidotroctes rectivenis,* above] it has hitherto been assumed that the fully winged specimens were males, the others females. In 1931, E.M.M., LXVII, 97, I recorded the occurrence of a brachypterous male. Since then I have examined three more short-winged specimens from Kuala Lumpur. Two of these are males, the third a female.

From Verrill's account—under the synonym *Heteropsocus dispar* (1903, Trans. Connecticut Acad., XI, 817)—one gathers that the long-winged examples are not numerous, and it is evident, from his description of the sexual appendages, that the macropterous specimens examined by him were females and not males as he supposed. It now remains to be ascertained whether both sexes occur with fully developed wings.

3. *Psyllipsocus ramburii* Selys : *Nymphopsocus destructor* Enderl.

Besides the differences in wing development and the usual morphological correlations therewith, *P. ramburii* has been said to differ further from the related micropterous *N. destructor* by the absence of anal spurs (strong spines, one at the apex of each paraproct). That is not, however, the case. In all the examples of the first-named that I have examined, anal spurs are distinctly present, although in one they are only a little stouter than the adjacent cilia, yet still distinguishable therefrom by their bases.

Although *Psyllipsocus* and *Nymphopsocus* are commonly found associated, the possibility of their being merely variations of a single dimorphic species has not been generally appreciated. Some years ago I had under observation two free-living colonies of *N. destructor* on the whitewashed walls of a damp outhouse. Perhaps because of abundance of food, the members of the separate colonies remained together during their development so that each community kept to a limited area of the wall. Imagines, all micropterous, were disclosed in both colonies towards the end of March. They gradually disappeared and after an interval more young insects were seen. In August, in each community, imagines in both the *Nymphopsocus* and *Psyllipsocus* forms appeared; inferentially, therefore, the two are conspecific, as their morphological similarities indicate. Moreover, intermediate forms occur. I have one specimen, otherwise of *Nymphopsocus* type, in which the wings reach nearly to the middle of the abdomen—they have been figured in 1924, E.M.M., LX, 122. In some examples of the full *Psyllipsocus* habitus the wings extend as far as the tip of the abdomen; in others they project beyond the end of the body for nearly half their length. Among the *Psyllipsocus* forms there is some slight variation in the depth of colouring.

All my macropterous examples, from various sources, have been taken at dates between the end of July and the middle of October, from which circumstance, taking into account also what could be deduced from my direct, though limited, observations, it might be inferred that alatae are produced only in the second, end of summer, brood. But the evidence is not conclusive, and Enderlein, in 'Die Tierwelt Mitteleuropas,' gives May as the commencement of the season for *Psyllipsocus ramburii.*

### 4. *Bertkauia lucifuga* (Rambur).

Referring to the only male of this species taken on the continent, Tetents remarked on the general resemblance of its forewing venation to that of *Epipsocus,* except for the presence of a connecting vein between pterostigma and radial sector. A figure of the wings of one side of that specimen has been given by Enderlein in Cat. Coll. Zool. Selys and repeated in 'Die Tierwelt Mitteleuropas.' Four other male specimens have been taken in the Bristol district. All of them have the venation in the same style, and none exhibits a stigmo-radial connection. That peculiarity of Tetens' specimen is undoubtedly an aberration, as its appearance indeed suggests. In all essential features the venation of *Bertkauia* is that of *Epipsocus.* (See figure given in 1925, E.M.M., LXI, 125).

Examination of figures of *Epipsocus* given by Hagen in 1882, Stett. Ent. Zeit., XLIII, and by Enderlein in 1911, Palaeontographica, LVIII, discloses further weighty resemblances between the two genera; mouth parts, claws, and female genitalia are identical in form. The insects differ in only one respect, the females of the type as well as of two other species referred to *Bertkauia* are apterous; the type female of *Epipsocus* is winged. Such a difference cannot, by itself, constitute a reason for generic separation. Unless, therefore, substantial divergencies in structure can be discovered to subsist between species with winged and wingless females, there appear to be no grounds for regarding *Bertkauia* otherwise than as synonymous with *Epipsocus.* Meanwhile it may be convenient to utilise the deposed name as a subgeneric designation for the species with apterous females.

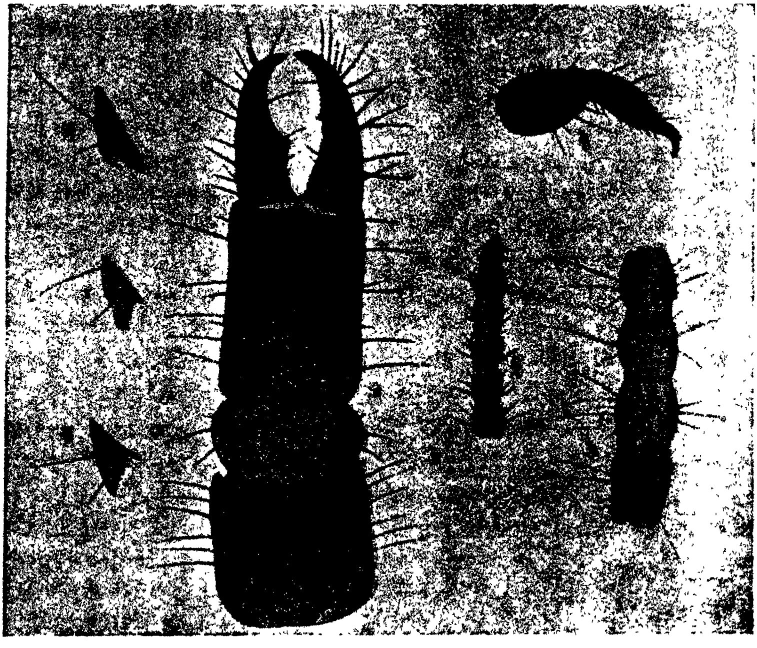
1 Pembroke Mansions,
Clifton, Bristol 8.
*November 1st,* 1934.

# A NEW SPECIES OF *JAPYX* FROM AUSTRALIA.

BY H. WOMERSLEY, A.L.S., F.R.E.S.

## **Japyx onkaparinga** sp. n.

*Description*: Length, 9.0 mm. Colour creamy-white except for the forceps and abdominal segments VIII to X, which are deep orange, the forceps being somewhat deeper. Head above with eleven long and five medium setae on each side. Antennae 26-segmented, segment III longer than broad, apical segment about half as long again as broad, setae on III 250 $\mu$ long, sensory setae on IV–VI = 3–3–4, these short and less than half as long as the ordinary setae. Thorax pronotum with five long and two shorter setae on each side, meso- and metanotum with three long and two shorter setae on each side. Legs: tarsi as figured (cf. fig.), median claw well developed. Abdomen: tergite I with a pair of fairly long submedian setae on the praescutum and a pair of longer submedian subposterior setae; II with a pair of rather short submedian praescutal setae and three long and one shorter setae on each side; III–VII with a pair of submedian praescutal setae and seven long setae on each side; VIII with one submedian subposterior long seta and four long lateral setae on each side; segments V–VII all with the posterior angles produced as figured (cf. figs. e–g). First abdominal tergite as in *J. tillyardi* Silv. Styles and vesicles normal. Segment X of abdomen nearly twice as long as wide, with almost parallel lateral carinae and with setae as figured. Forceps asymmetrical, left arm with a large postmedian tooth, preceded by a double row of teeth, the dorsal row consisting of eleven rounded teeth and the ventral row of four slightly recurved, pointed teeth, and the large



*Japyx onkaparinga* sp.n.

tooth is followed by about six rounded teeth; right arm with a large premedian tooth preceded by three rounded teeth and followed by twelve or more rounded tubercles.

*Locality:* A single specimen found under a stone on the bank of the Onkaparinga River, at Mylor, South Australia, 23.10.34 (H.W.).

*Remarks:* In my key to the Australian species of *Japyx* (Trans. Roy. Soc. S.A., V. 58, p. 46, 1934), this species comes near to *J. tillyardi* Silv. and *J. mjöbergi* Silv., but in the dentition of the forceps and in the posterior angles of tergite V.

36 Wattle Street, Fullarton Estate,
Adelaide, S.A.
*December 29th,* 1934.

*On the occurrence of Lyctus brunneus Steph. in Britain.*—In Mr. R. C. Fisher's note on the occurrence of *Lyctus brunneus* Steph. in Britain (*antea,* p. 42) he tells us it has been obtained from home-grown timber, chiefly oak, from most parts of England and from Central Scotland.

I presume this statement means that it has spread considerably in recent years. In my maps showing the British distribution of the rarer species of Coleoptera found in Windsor Forest the most northerly county marked is Nottinghamshire (Sherwood Forest), just a little further north than Mr. Stott's Staffordshire record. I do not see why *L. brunneus* should be considered to be an imported species any more than *L. linearis* Goeze. Stephens described *L. brunneus* over a hundred years ago, from a specimen found in a wasp's nest at Dulwich.

I took *L. brunneus* and *L. linearis* both equally commonly at Sydenham in 1889. They were breeding in some rustic seats in the conservatory in my father's house. I take both species in Windsor Forest on new oak fences (though *L. linearis* is much more abundant than *L. brunneus*), the fences being made of wood grown in the Forest. Last year we found specimens of *L. brunneus* under planks in the sawmill at Windsor. Only timber from the Great Park and Forest is cut up in the sawmill. On June 18th, 1927, I took *L. linearis* from under the bark and boring into a stunted oak stump in Windsor Forest. —HORACE DONISTHORPE, Department of Entomology, British Museum (Natural History): *March 4th,* 1935.

[Many years ago I used to meet with *Lyctus brunneus* occasionally in Cobham Park, Kent, walking on recently felled and barked oak trunks. In the Oxford district the beetle was found sparingly in all its stages in a decayed part of a fresh oak log by the roadside near Stanton St. John, Oxon, July 30th, 1927.—J.J.W.]

***Coleoptera in Dumfriesshire.***—Last year we had quite normal weather here, the long dry spell experienced in the south not extending to this district; beetles were consequently in their usual numbers, excepting the great numbers of Coccinellidae observed. The species here enumerated have not (with two or three exceptions) been included in my previous notes. ***Cillenus lateralis*** Sam., under stones below high water mark in June at Gretna and Browhouses, sometimes half a dozen occurring under one stone. ***Bembidion obtusum*** Serv. I have taken very occasionally, while ***B. guttula*** Fab. and ***B. mannerheimi*** Sahlb. can be met with at any time. A pair of *B. rupestre* Linn. came from a gravel bed on the R. Kirtle, where *B. ustulatum* Linn. is abundant and *B. andreae* Fab. is not rare. A specimen of *Graptodytes lepidus* Ol. was fished out of a Sphagnum pool on Newton Moss. *Limnebius truncatellus* Thunb. occurs occasionally in refuse along the estuary. *Ochthebius auriculatus* Rey, a few in tidal refuse on the marsh at Gretna; and *O. impressicollis* Cast. was beaten from long grass growing on the edge of a creek. *Plataraea brunnea* Fab., near Springfield, by evening sweeping in June; one only. *Staphylinus similis* Fab. rare, one under a stone in September. *Stenus canaliculatus* Gyll, odd examples swept on Newton Moss. *S. fulvicornis* Steph. is frequent in moss and flood refuse. *Bythinus bulbifer* Reich., several swept in August. *Clambus minutus* Stm., one by evening sweeping in July. *Catops chrysomeloides* Panz. hardy common, odd specimens swept on Newton Moss. *Melanophthalma gibbosa* Hbst. common. *Rhizophagus bipustulatus* Fab., *R. dispar* Payk., and *R. depressus* Fab. are not uncommon under fir bark in a small wood at Stoney Brig. *R. ferrugineus* Payk. I have taken at Nutberry Moss. Certain species of Coccinellidae were about in large numbers. *Coccinella 10-punctata* Linn. was unusually abundant in autumn, the larva, pupa and imago swarming on birches. *C. hieroglyphica* Linn. was also plentiful on heather, but showed little variation excepting a fair proportion of the black form. Three specimens of *Halyzia 16-guttata* Linn. were taken at Nutberry, one on August 24th and two on September 20th; this species is rare here. *H. 14-guttata* Linn., this, too, was in more than usual numbers. *Micrurula melanocephala* Marsh., one beaten from flowers of *Prunus communis* on May 2nd, near Springfield. *Liodes calcarata* Er. fairly common by sweeping long grass in summer. *Agathidium nigrinum* Stm., one swept in a lane in June. *Typhaea stercorea* Linn. common in autumn. *Aphodius contaminatus* Hbst. occasionally met with in late autumn. *Aegialia sabuleti* Panz., on the R. Kirtle, local and not very common. *Melolontha melolontha* Linn.: my only experience with this species here was a crushed example lying on a road near Springfield. *Cyphon ochraceus* Steph. very common among rushes. *Malthodes marginatus* Lat. generally distributed in June. *Plateumaris discolor* Panz. is some years common in buttercup flowers in June on most mosses in the county. *Sermyla halensis* Linn. is very local on *Galium* in autumn by the roadside about one mile west of Gretna. Dr. Joy does not give it from 'Scot. I.' *Rhynchites nanus* Payk. local, Newton Moss. *R. germanicus* Hbst. local, but more plentiful than the preceding. *Strophosomus retusus* Marsh. local and not common. *Sitona flavescens* Marsh. common in autumn with others of the genus. *Barypithes araneiformis* Schk., a few on a sandy bank at the mouth of the R. Kirtle at the end of May. *Rhinoncus pericarpius* Linn. common everywhere in summer. *Ceuthorrhynchus triangulum* Boh.: I again met with this species near Springfield (*cf.* Ent. Mo. Mag., LXX, p. 19); a very few on *Achillea*. *Mecinus pyraster* Hbst. not common here. *Limnobaris pilistriata* Steph. occurs among reeds not rarely. *Gymnetron veronicae* Germ. occurs singly on various plants, and almost all referable to the var. *nigrum* Walt. *Notaris acridulus* Linn. local; in small numbers at Nutberry and near Chapelknowe. *Myelophilus piniperda* Linn., *Hylurgops palliatus* Gyll., and *Hylastinus obscurus* Marsh. all occur under bark in a small fir wood at Stoney Brig. The Hawthorn flowered profusely, but was not very productive, *Anaspis ruficollis* Fab., *A. maculata* Fourc., and *A. rufilabris* Gyll. being about in smaller numbers than usual. A pair of *A. subtestacea* Steph., both ♂♂, were taken in June. My thanks are due to Mr. J. Collins for kindly naming or checking several insects in this list.—JAS. MURRAY, 6 Burnside Road, Gretna, Dumfriesshire: *January 14th, 1935.*

*Irish Coleoptera: New County Records.*—The following beetles are, as far as I have been able to find out, new records for the County or larger area mentioned in each instance.

1. *Tachyporus formosus* Matth. Found in flood rubbish at Drum, Co. Antrim, in April, 1934.
2. *Lesteva pubescens* Man. One example found near Drum Bridge, Co. Down, in June, 1934.
3. *Apion cruentatum* Walt. One got at the Giant's Causeway, Co. Antrim, on 30th September, 1933.
4. *A. aethiops* Hbst. Found at Ballyliffin, Co. Donegal, on 8th August, 1933.
5. *Anthonomus comari* Crotch. One from Newcastle, Co. Down, on 2nd August, 1933.
6. *Orthochaetes setiger* Beck. In garden rubbish at Belfast, Co. Antrim, on 20th March, 1934.
7. *Haliplus immaculatus* Gerh. One in W. Galway on 13th July, 1934, and two (male and female) in Lennoxvale pond, Co. Antrim.
8. *H. flavicollis* Sturm. Two from Lennoxvale pond, Co. Antrim: one in May and one in August, 1934.
9. *Coelambus impressopunctatus* Schall. Two caught by Professor Gregg Wilson in a pond near Belfast, Co. Antrim.
10. *Deronectes depressus* F. One found at Recess in W. Galway, on 13th July, 1934.
11. *Oreodytes borealis* Gyll (*davisii* Curt.). One in the open country above Ligoniel, Co. Antrim, on 1st June, 1934.
12. *Rhantus exoletus* Forst. One from river in Co. Cavan on 12th July, 1934.
13. *Ilybius obscurus* Marsh. One, on 19th May, 1934, in the Lagan Canal, Co. Antrim.
14. *Acilius canaliculatus* Nic. A male and a female found in the Lagan Canal at Lambeg, Co. Down, in May, 1934. The only Irish locality for this beetle up to now has been Co. Armagh, so this is a considerable extension of its range.
15. *Philydrus testaceus* F. One in Lennoxvale pond, Co. Antrim, in May, 1934, and another at Carrick-on-Shannon, Co. Leitrim, in July.
16. *Philydrus minutus* F. From Ballylough Bog, near Bushmills, Co. Antrim, 3rd September, 1934. An Ulster record.
17. *Donacia crassipes* F. One found on 11th July, 1934, while looking for water-beetles in river at Gortnacarrow, Co. Fermanagh.
18. *Psylliodes picina* Marsh. One on banks of the Bush river, near Portballintrae, Co. Antrim, on 8th September, 1934.
19. *Cyphon coarctatus* Pk. One from near Cong, W. Galway, on 15th July, 1934. A record for Connaught.
20. *Catops fuscus* Pz. One at Portballintrae, Co. Antrim, on 5th September, 1934.
21. *Dryops griseus* Er. Five from flood water of the Stoneyford Reservoir on 20th October, 1934, and another at same spot a week later. This beetle was first reported in Ireland by Mr. Edwin Bullock, from Co. Kerry (*vide* Ent. Mo. Mag., Vol. LXVIII, 1932, p. 130), so this record is new for Ulster (Co. Antrim).
22. *Coccinella 14-punctata* L. One at Carrick-on-Shannon on 16th July, 1934, and another next day at Ballinamore; both places in Co. Leitrim.

For kind help in identification of numbers 1—6, 15, 18—21, I am indebted to Dr. K. G. Blair; of numbers 7, 8, 13 and 16 to Professor F. Balfour-Browne;

and of 11, 12, 14 and 17 to Mr. Eugene O'Mahony, of National Museum, Dublin. —W. M. Crawford, 58 Marlborough Park South, Belfast: *February*, 1935.

*A Beech-tree's Insects and their Parasites.*—During the whole of June and July, 1934, I paid considerable attention to xylophagous insects in the New Forest, and especially in Denny, to those of one ancient beech stump, about twenty feet in height, that was partly barked. These latter prove, upon examination, to embrace so large a percentage of uncommon kinds pertaining to several Orders that their enumeration is not without particular interest, especially in the inter-association of the parasitic Diptera and Hymenoptera with other denizens of this old beech. These in ascendant order have been determined as follows.

Beneath the bark of those parts to which it still adhered, though much of the trunk was bare, were found the beetles *Homalota cuspidata* Er. et spp., *Philonthus splendidulus* Gr., *Othius melanocephalus* Gr., (on June 6th only) *Abraeus globosus* Hoff., *Ditoma crenata* Fab., numerous *Cerylon histeroides* Fab. and *ferrugineum* Steph. and *Rhizophagus bipustulatus* Fab., with a few *R. depressus* Fab., *Silvanus unidentatus* Fab., *Tiresias serra* Fab., the very local *Melasis buprestoides* L. and *Clinocara undulata* Kr., both larvae and just-emerged imagines of *Pyrochroa coccinea* L. in early June, with numerous *Tomoxia biguttata* Gyll. skipping about the bark in early July.

Walking among the mosses just above the ground were noted the beetles *Agathidium laevigatum* Er. and *Melandrya caraboides* L., the brachypterous ichneumon *Phygadeuon marshalli* Bdg. and the Braconid *Meteorus deceptor* Wesm. Here the flies *Xylota segnis* L. and *florum* Fab. were wont to sun themselves, and a few of the Syrphid *Criorrhina floccosa* Mg. were flying about the moss as though seeking to oviposit in subterranean bees' nests there.

Immediately above the basal moss grew a profusion of small *Polyporus*-fungi, wherein were the Clavicorns *Scaphidium quadrimaculatum* Oliv. and *Scaphisoma boleti* Panz. Sitting quiescently among these fungi were the micro-moths *Dasycera sulphurella* Fab.; during only 12th—17th June, *Borkhausenia panzerella* Steph.; *Cerostoma costella* Fab.; and very many examples of four Tineae, *i.e.* the usually rare *Scardia boleti* Fab.; *Tinea parasitella* Hb., during 6th—21st June only, many of whose pupae protruded from the fungi; the beautiful *T. fulvimitrella* So., during 6th—21st June only; and masses of *Tinea cloacella* Hw. Sitting contentedly upon the underside of *Polypori* were a dozen or more of the Platypezid Dipteron *Callimyia speciosa* Mg. and a few *Sapromyza fasciata* Fln. Also, flying around these fungivorous insects, were the parasitic Braconids *Euphorus pallidipes* Curt., *Dolops hastifer* Marsh, *Blacus hastatus* Hal., *Histeromerus mystacinus* Wesm.—probably the first ever netted wild in Britain (cf. Trans. Entom. Soc., 1885, p. 75, and 1907, p. 27), and the very distinct *Apanteles adjunctus* Nees, which was abundant at the holes of *Ptilinus*. Flying to parasitise insects in the moss, or the fungi covering the trunk for a couple of feet above it, were various ichneumons, including *Cubocephalus brevicornis* Tasch.

Sitting quiescently by day, in depressions of the trunk at about five feet from the ground, were the Geometers *Ectropis consonaria* Hb., on 26th, and a freshly-emerged specimen of *Hydriomena bilineata* L., on 12th June.

On the bare trunk, where the bark had been long removed, were resting, for the most part very sluggishly, at some six or eight feet above the ground, the beetles *Priobium castaneum* Fab. and a great profusion of *Ptilinus pectinicornis* L., with the latter's parasitic Malacoderm *Tillus elongatus* L., which was unusually common all over the Forest this year; the Longicorns *Leptura scutellata* Fab., that was seen actually to emerge from the beech on 15th June, and a fine male *Prionus coriarius* L., late in July. Probably also parasitic on the *Ptilini* were several examples of the Chalcids *Trigonoderus obscurus* Wlk. and *princeps* Westw., which have occurred to me in the same association in Suffolk, though always upon dead willow trees. Here too were some of the dipterous *Neoitamus cyanurus* Lw. and a full series of the extremely local *Xylophagus ater* Fab., never seen by me in the Forest before (after an experience beginning in May, 1895 : cf. Ent. Mo. Mag., XXXI, p. 192), though occurring sparingly in the Rhinefields Rhododendron-drive.

Flying around the trunk, always at this height, with a view to ovipositing in the beetle-borings, were some most interesting Ichneumons : very numerous *Cecidonomus inimicus* Gr., with equally common *C. gallicola* Bdg. ; *Nyxeophilus corsicus* Marsh., during early June only ; the fourth British specimen of *Xylonomus securicornis* Hlg., a female ; one male of the rare *Ischnocerus rusticus* Fourc., pretty surely at a burrow of *Priobium* ; very many *Lissonota carbonaria* Hlg. and a few *L. unicincta* Hlg. ; a single beautiful male, on July 6th, of the rare *Mesoleius ustulatus* Desv., which is likely to be a Sawfly-parasite ; *Nemeritis rufipes* Bdg., that is not improbably a mere form of *N. cremastoides* Hlg., also here present ; and the Tachinid Dipteron *Ptilops chalybeata* Mg.

Nesting in rotten wood of the trunk, at about six feet from the ground, were numerous *Pemphredon lugubris* Fab., with which nothing seemed to be associating.

Nesting distinctly higher in the trunk were a good many other Fossors, such as *Crabro leucostomus* L., *C. vagabundus* Panz., and *C. cavifrons* Thoms. Here too were the fine Tipulids *Dictenidia bimaculata* L., *Ctenophora pectinicornis* L., a very few of the local *Limnobia annulus* Mg., and numerous examples of a species that may be *L. trivittata* Sch., to a leg of which a Chelifer (presumably *Chernes nodosus* Schr., and new to Hants.) was tightly clinging by its pincers.

Nesting near the riven top of the stump, fully fifteen feet high, was at least one strong colony of the social wasp *Vespa rufa* L., but I did not try to discover either *Velleius dilatatus* or *Metoecus paradoxus*, which I have taken in the Forest before now, in this topmost denizen of the prolific old beech.—CLAUDE MORLEY, Monks' Soham House, Suffolk : *February 10th*, 1935.

*A late larva of Pieris brassicae L.*—On February 16th a young friend brought me a full-fed larva of *Pieris brassicae*, which had been found on a cabbage brought in from the garden. It was much smaller than the normal larva, and was apparently in a moribund condition. It had, however, strength enough to pupate, though it did not spin the usual web, nor did it quite succeed in escaping from the cast-off skin. The pupa measured 17 mm. in extreme length, as compared with 24 mm. for two well-grown normal pupae. Including a small part of the skin, it weighed 0.134 gram., as compared with 0.357 gram. for a well-grown male pupa and 0.435 gram. for a well-grown female pupa ; the first two results agree very well with the relative weights as calculated from the lengths. Unfortunately the pupa died very soon after pupation, so that there was no opportunity of breeding the imago.

The latest date on which I had hitherto seen wild larvae of *P. brassicae* was in early December, 1904, when they were found in numbers feeding on *Tropaeolum* in a garden in Beverley.—GEO. B. WALSH, 22 Stepney Drive, Scarborough : *March 14th*, 1935.

*An early appearance of Colias croceus Fourc.*—I have just heard from my niece, Mrs. Waller, that *Colias croceus* Fourc. was seen flying near Torquay on

February 19th this year.—EDWARD B. POULTON, Oxford: *February 22nd*, 1935.

[Only one record of *C. croceus* having been found alive in this country in winter has so far come under my notice. In the 'Entomologist's Weekly Intelligencer' of April 11th, 1857 (Vol. II, p. 11), a Mr. J. Cranstone writes from Bath as follows: '*Colias Edusa hybernating.*—On the 24th of February last I was out pupa-hunting, and on pulling down some thick ivy from an old wall I discovered a very good specimen of *Colias Edusa* from an interstice in the wall: when it had been in a warm room for two or three hours it revived a little and crawled about . . .'

The butterfly noted by Mrs. Waller may thus have been one of the autumn brood which had passed the early winter months in a state of quasi-hibernation, as *V. atalanta* undoubtedly does sometimes; or a larva resulting from the autumn brood may have been able to feed up and pupate in a sheltered situation, under the exceptionally mild conditions of the present winter. Although *C. croceus* is on the wing throughout the whole year at Gibraltar and other Mediterranean localities, immigration may certainly be ruled out in the present instance.—J.J.W.]

*The Puzzle of 'Tettix bipunctatus.'*—Most entomologists, especially those who use the sweep-net, are familiar with the squat, brown, horny little grasshopper that is generally known by the above name. It is nearly all pronotum and, normally, cannot fly. Abundant as it is, and generally known, there remain several problems connected with it.

It differs in habits from other grasshoppers, being adult in spring and early summer, the adults giving place to immature ones about midsummer, the new generation hibernating and appearing as adult in the following May.

It is now recognised that no less than three species have been confused under this name, for which reason material is needed from districts as widely separated as possible. The distinctions are very slight, but constant. The clearest is the form of the middle segments of the antennae.

In the typical species, *bipunctatum* of Linnaeus, these are very short, about twice as broad as long. This appears to be a northerly species, and is known to occur in Scotland, but is not yet known from England. These segments are somewhat longer, about three times as long as broad, in *kiefferi* Saulcy, which is more southerly, and seems to be the only one of the three known in England. They are four times as long as in *tenuicorne* Sahlb., which is not known from Britain or Scandinavia.

The question is also complicated by the existence of polymorphism. Haij, in his analysis of the Swedish species, recognises three forms of *kiefferi*, and no less than five of *kraussi*, which is now established to be a synonym of *bipunctatum* by Alder.

It is very desirable to establish the status of our British species, to map their areas of distribution, both horizontally and vertically. Entomologists in the field will assist very much if they will collect material, especially from the north of England, from Scotland, and from Ireland.

I may add that unfortunately we are obliged now to call the genus *Acrydium*. —MALCOLM BURR, United University Club, Pall Mall East, London, S.W.1: *February 24th*, 1935.

*Cardiastethus fasciiventris Garb. in Suffolk.*—On April 1st, 1934, I was fortunate enough to take a small series of this rather uncommon bug a little way east of Barton Mils on the Tuddenham road. Although I see from Butler's 'Biology of the British Hemiptera' that this bug is associated with pines, I am quite sure that my specimens were taken from gorse, though the large patch that I worked lay in a wide ridge on the side of a hill with Scotch pine on one side and small spruce on the other. One interesting point was that, despite the cold wind, these little bugs were very active in the net, and I was surprised to find mature examples so early in the year.—H. R. P. Collett, 'Lauriston,' Park Road, Timperley, Cheshire: *February 11th,* 1935.

## Societies.

Entomological Club.—The Verrall Supper Meeting was held at the Holborn Restaurant on January 15th, 1935. The meeting was called for 6.30, and before supper, which was served at 8 o'clock, a conversazione was held in the reception room.

Professor Sir Edward Poulton, F.R.S., was voted to the Chair as an expression of the members' appreciation of the honour of knighthood recently conferred upon him.

The guests are now too numerous to mention, and in future a full list of names will not be published. In this case the attendance was 176, which is again a record.

Mr. Jas. E. Collin, the Verrall Supper Member of the Club, again made all the arrangements and is to be congratulated on the wonderful success of the meeting. The details were perfect and the smoothness and pleasure of the evening were due to his excellent organisation. It is essential, however, that application for invitations must be in every case made direct to Mr. J. E. Collin, 'Raylands,' Newmarket, and in no other way can the issue of invitations be allowed.

The Chairman made the usual reference to the memory of the late Mr. G. H. Verrall, the founder of the gathering, which was received in silence, the company standing. Later in the evening Mr. J. E. Collin spoke of the progress of the Verrall Supper Association of Entomology and again reminded his hearers of the existing rules framed to ensure the success of the gathering, and it was to be hoped that the membership and subscription list might be increased to enable the function to be greatly extended.

Mr. Collin gracefully referred to the honour of knighthood recently conferred on the Chairman and to the great services Sir Edward Poulton had rendered to Entomological Science, and the inspiration he had given to all with whom he had come into contact. This distinction was not only a personal one, but a gesture of appreciation to Entomological Science. These remarks were received with great applause and musical honours for the Chairman.

The meeting broke up at a late hour, and was one of the most successful yet held.—H. Willoughby Ellis, *Hon. Secretary*

The Royal Entomological Society of London. Annual Meeting: *Wednesday, January 16th,* 1935.—Dr. S. A. Neave, O.B.E., President, in the Chair.

The President moved a vote of congratulation to Sir Edward Poulton on the honour recently awarded to him, and this was passed with acclamation.

Mr. A. W. McKenny-Hughes, Secretary, read the names of Fellows nominated as Officers and Council for the ensuing year, and announced that they had been duly elected in accordance with the Bye-Laws.

The Secretary read the Report of the Council, which was adopted on the motion of Dr. E. A. Cockayne, seconded by the Rev. E. B. Ashby.

The Treasurer, Mr. Francis Hemming, C.B.E., read his report, and this, with the Accounts for the year, was adopted on the motion of Mr. H. M. Edelsten, second by Sir Edward Poulton.

The President read his Address, after which a vote of thanks to him, coupled with the request that the Address might be published in the Proceedings, was moved by Dr. K. Jordan, and carried unanimously.

A vote of thanks to the Officers for their services was passed on the motion of Dr. H. Eltringham, seconded by Sir Edward Poulton, and carried unanimously. Mr. A. W. McKenny-Hughes and Mr. Francis Hemming briefly replied.

*Wednesday, February 6th*, 1935.—Dr. S. A. Neave, O.B.E., President, in the Chair.

The President announced that he had nominated Mr. C. L. Collenette, Dr. H. Eltringham, F.R.S., and Dr. A. D. Imms, F.R.S., as Vice-Presidents for the year.

The following were elected Fellows of the Society: John Christopher Beadnell Craske, 57 Cornwall Gardens, S.W.7; John Hugh Graham Grieve, B.Sc., Public Health Service (Entomologist), Durban, South Africa; Leonard Parmenter, 94 Fairlands Avenue, Thornton Heath, Surrey.

The President announced the death of Dr. F. A. Dixey, F.R.S., elected in 1887, a former President of the Society. A vote of condolence with the relatives of Dr. Dixey was passed on the proposal of the President and Council. The death of Mr. W. G. Clutten, elected a Fellow of the Society in 1922, was also announced.

The Secretary made the following announcement:—The Council of the British Association has recently made arrangements with the Ministry of Health by means of which the Association is informed of schemes in progress for town and country planning. The Association is anxious that it should receive information regarding any site of scientific interest which it is desirable should be included in a town or country planning scheme, or for which valid reasons could be advanced for its being scheduled as a Nature sanctuary. Fellows of the Society are therefore invited to inform the Secretary of any districts which they consider should be included under either of the above headings.

The President exhibited a small collection of British Insects collected, and in many cases bred, by Herbert Spencer as a boy. These had been handed to the Society for safe keeping by the Herbert Spencer Trustees. Sir Edward Poulton discussed (1) Monsieur Ghesquière's determination of the food plant of the Ethiopian Nymphaline butterfly *Cymothoe coenis* Drury; (2) Dr. W. A. Lamborn's notes on a remarkable inquiline larva, probably Lepidopterous, in Termitaria (Nyasaland), also on the method of attack on Termites adopted by Ponerine ants; (3) Dr. Lamborn's observations on the distasteful qualities of the conspicuous Ethiopian Acridian, *Zonocerus elegans*; and (4) on behalf of Dr. J. G. Myers, Señor Oscar Monte's notes (1932) upon the Neotropical Fulgorid *Laternaria*. Mr. L. G. O. Woodhouse, a visitor, explained a method he had perfected of making butterfly pictures by transferring the scales to paper. Mr. M. O. T. Iyengar, a visitor, spoke on the biology of some mosquito larvae which attach themselves to the roots of aquatic plants, illustrating his remarks with lantern slides. Major H. C. Gunton discussed further records of some collaborated phenological records from England.—A. W. McKenny Hughes, *Hon. Secretary*.

# REMARKS ON THE NAME OF *BORIOMYIA NERVOSA* FABR.

BY KENNETH J. MORTON, F.R.E.S.

PLATE IV.

It will be observed that I still use the name of *nervosa* for this well-known species of Hemerobiidae, although Mr. Killington in a recent excellent paper (Trans. Soc. Brit. Ent., I, pp. 119-134, Plates XIV-XVII), has followed Dr. Esben-Petersen in adopting the name *betulina* Strøm. The reason he gives for this *volte-face* is that Strøm's figure of the larva ' although rather crude, shows a definite attempt to depict the body markings, whereas he leaves the head clear of markings except for some shading in the posterior margin; and it seems certain that if he had had the larva of *subnebulosa* he would have indicated the extensive dark pattern of the head.' Killington here seems to follow the line of argument used by Petersen in connection with the male appendages. Schöyen had suggested *subnebulosa* as Strøm's species and Petersen (Norsk Ent. Tidskrift, Bd. II, Heft I) said with regard to the appendages, that ' these are of a so peculiar shape that H. Strøm would undoubtedly have given remarks as to them if the species had been *subnebulosa*.' Perhaps I may be allowed to use like privileges and to say that, looking at the extremely crude and very insufficient character of Strøm's figures and descriptions of both larva and imago, I consider that it is highly improbable that he would have done anything of the kind suggested by my friends. Such statements are quite incapable of proof. Arguments which postulate that an eighteenth century author would undoubtedly have done certain things implying a discernment beyond anything warranted by his crude figures and imperfect descriptions, have very little value. In the present matter, however, it seems to me they make clear that an identification of *nervosa* with *betulina* will rest on conjecture. I fail to see what interest attaches to a forced determination of this kind or what advantage accrues from the resulting change of name. Moreover, it is quite a mistake to regard the question as touching solely *nervosa* and *subnebulosa*: the issue is much wider.

It may be useful to give a brief summary of the course of this controversy as far as it is known to me. Hagen (Hemerobidarum Synopsis synonymica, 1866) lists the name *Hemerobius betulinus* Strøm without referring it to any other species. I do not know whether he at some later time suggested a connection with *nervosa*. McLachlan, however, had taken a fancy to Strøm's works, probably in connection with *Aeschna coerulea*, and we find him in 1899 (E.M.M., XXXV, p. 78) writing that he had ' a very strong opinion that *H. nervosus* was in all probability *H. betulinus* Strøm.' He was almost but not altogether convinced, and he continued to use *nervosus*, alleging that his dislike for upsetting existing nomenclature deterred him from adopting *betulinus*. He was always cautious, but indecision like this was not characteristic. If he had been perfectly convinced I am quite satisfied—and I am speaking of a man I knew well—he would have acted: he was not sure. His first impression after examining Strøm's figures favoured *Boriomyia mortoni* (a species already known to him from Continental specimens but at the time still undescribed) as the form of Strøm's wing-figure seemed to him to agree better with that species than with *nervosa*, and it is within my knowledge that *mortoni* was within an ace of being introduced as *betulinus* from the specimens (ultimately the types of *mortoni*) which I had taken at Rannoch in 1898. If McLachlan had adopted the name of *betulinus* for *mortoni* it is not improbable that his action would have remained unchallenged. However, he finally decided in the whole circumstances to describe the Rannoch insect as new under a name which I hope may withstand the assaults of time, although I am not too sure about that! McLachlan thus left *nervosa* in an unsatisfactory position and his words gave a bias which led Esben-Petersen to adopt *betulina* for *nervosa* without a scrap of fresh proof, and he has been followed by Killington for the reasons given above. What has been written hitherto on the subject has related to the imago and has not been convincing on account of the inadequacy of Strøm's description. Killington's good work with the larva of *nervosa* places the matter in the way for a fuller and more critical consideration of the claims of *betulina* versus *nervosa*.

Some years ago a Norwegian correspondent very kindly sent me a copy, in MS., of Strøm's paper and with it a photograph of the relative plate. There is, of course, no existing 'type' material to found on. Being, as I think, pretty fully informed, I have no hesitation in preferring to retain the name *nervosa* because I consider that the latest and most important contribution (Killington's) to the discussion, while it may establish that the larvae of *B. subnebulosa* and *nervosa* differ in appearance, does not advance one whit the claim that *nervosa* is a synonym of *betulina*, but is rather good evidence to the contrary. In taking the opposite view, Mr. Killington does very scant justice to the fine specific values which, as far as I am able to judge, are brought out in his own beautiful drawing and full description of the larva of *nervosa*. In comparing the two descriptions and figures the following remarks occur to me.

That Strøm's figure 2 represents in a way some kind of Hemerobiid larva may be conceded; at the best it may be considered a schematic representation of such a larva but not a good one. Its imperfections are obvious and when confronted with Killington's figure the discrepancies are rather glaring. For example the relative length of the different mouth-parts is wrong and the jaws are fused with the head and broadly confluent with each other at the base. The legs are described by Strøm as rather long and extended; indeed they are too long, their various joints are incorrectly drawn and in particular the tarsal claws are half the length of the whole tarsus, which is surely absurd. The anterior sub-segment of the prothorax, which in both text and figure is treated as a separate segment, differs in shape from Killington's as also do the other thoracic segments, and apparently one of the abdominal segments is omitted. Whatever allowances one may be disposed to make for such errors, they seem to dispose of Esben-Petersen's assumption that Strøm had acumen enough to discern differences in the anal appendages of allied species of Hemerobiids. Importance is attached by Killington to Strøm's attempt to depict the body markings. To admit that such an attempt has been made is one thing; to admit that the attempt has had success is quite another. There is a limit to the allowances one can reasonably be asked to make. In my opinion too much in that way is required. In fact, over all, it is very difficult to find wherein Strøm's figure agrees with Killington's; on the other hand differences abound. My further remarks will deal more particularly with colours and markings.

The observations of Killington deal exclusively with Strøm's *figure* of the larva: Strøm's *description* cannot be ignored. The reference to the body colours by the latter seems to be confined to a few words: 'Farven er enten guul-eller röd-agtig og med mörke Flammer ligesom Marmor.' The body, according to Killington, is cream white or white, which does not agree with Strøm's yellowish or reddish.

Great importance is attached to the head. Its deformities, as shown in Strøm's figure, have been noticed. Killington points out that the median elongate, wedge-shaped mark so characteristic of most Hemerobiid larvae is very indistinct in *nervosa*; its outline in his figure is strictly in accord, being no more than traceable. It strikes me as remarkable that Strøm should define the wedge with especial sharpness. Herein is a mystery: Strøm, who failed to see the anterior boundary of the head, emphasises what is almost invisible. That is not all. It is an error to say that the shading of the head is confined to the posterior margin as it extends to the eyes and in no way whatever does it agree with the two very dark and very definite patches at the posterior margin shown in Killington's figure. The photograph before me shows that the deficiency in the shading on the left hand is due to a bad impression, evidently the result of a fault in the original engraving or lithograph; with a hand-lens the shading is seen to reach on both sides equally to the level of the middle of the eyes. There is no ground for the conclusion that Strøm's larva had a practically pallid head as one is asked to assume. Strøm himself says nothing about it, and the point has no significance, since he shows other parts of the body black which Killington renders white.

The principal discrepancies between the two figures may be shown better in parallel columns.

| Strøm's Figure. | Killington's Figure. |
|---|---|
| *Head.* | |
| V-shaped mark conspicuous. | Mark barely visible. |
| Evenly shaded to the level of middle of the eyes (see above). | Conspicuous twin black patches on posterior part; slight diffused shading not extending to the eyes. |
| Eyes shown pale. | Eyes 'black and very conspicuous' (text). |
| *Prothorax.* | |
| *Anterior subsegment.* | |
| Round. | Transverse. |
| Anteriorly more than one-half definitely black. | Anterior part unmarked and stated in text to be cream-white. |
| Posterior part quite unmarked. (I do not see how the striking differences shown here can be explained away.) | Posterior part with four more or less separate spots. |
| *Middle subsegment.* | |
| Basal part narrower than preceding subsegment. | Not narrower at base than preceding subsegment. |
| At the base black for its whole breadth. Other markings vague excepting as undernoted. | Dorsum practically wholly pale excepting as mentioned below. |
| *Sclerites* very large, roughly oval, slightly crescentic, ***convexity on outer side***; isolated, *i.e.* not closely connected with any dark shading. (These sclerites are in text called 'indtrykte Puncter.') | Sclerites large, oval, slightly crescentic, ***convexity on inner side***; connected anteriorly and posteriorly, with dark shading, the latter markings diverging rather sharply and running to the hinder angle of the segment. |
| Silver coloured (or silvery). | Shining fuscous brown. |
| *Posterior subsegment.* | |
| Dark shading on centre only and laterally beyond spiracles. | Centre pale, with darkish patches on either side. |

*Mesothorax.*

| | |
|---|---|
| The only important markings on dorsum are crescentic shadings extending to nearly the whole length of the segment. | The greater part of the dorsum is covered with darkish shading; the pale central area increases towards the posterior margin. |
| *Sclerites* large and very conspicuous; described in text as 'Puncter' like those on prothorax but round; they stand isolated in the clear spaces bounded by the crescents. | Rather minute, elongate, 'blackish,' with very fine pale margin; enveloped more or less in dark shading, they are far from being conspicuous. |

*Metathorax.*

| | |
|---|---|
| No central clear area is shown; the whole dorsum is covered with scattered dark flecks of diverse form, which I do not pretend to interpret. | Very similar to mesothorax in markings. |
| *Sclerites* large and similar to those of mesothorax; conspicuous in the middle of the flecks. | Like those on metathorax, small and equally inconspicuous. |

*Abdomen.*

| | |
|---|---|
| Dark bands apparently fused at the base, then very slightly divergent—almost perpendicular—to apical end of segments; such curve as they have shows convexity on the inner side. | Dark bands distinctly separated at the base, at first strongly divergent, then strongly recurved at the intersegmental sutures; their convexity is accordingly on the outer side. |
| Bands evenly shaded throughout. | Bands in part with conspicuous darker spots and streaks. |
| Two terminal segments, not darker than the rest. | These segments much darker on account of the presence of sclerites. |

It should be kept in view that McLachlan was of opinion that Strøm had possibly confused more than one species in the larval state and in this McLachlan would seem to have been right. Mr. Killington's negative hardly meets the case. Strøm met with larvae at various times and under different conditions and in autumn and spring in great quantities. Is it asserted that Strøm made no mistake and that all his material belonged to one species? Neither the implication that Strøm was able to distinguish between different species of Hemerobiid larvae, nor the alternative that the birches and alders of Norway have but one kind of Hemerobiid tenant, is acceptable. Larvae and imagines alike, all were to him *Hemerobius betulinus*, the one and only Hemerobiid species known to him, but surely a composite one which he was able only to compare with '*Hemerobius flavicans* Linnaei,' a species as far as I know never satisfactorily elucidated, but which has been considered to be a Psocid. There is no evidence whatever that the wing which Strøm figured (his fig. 5) had any actual connection with the larva he selected for his fig. 2. The neuration points to a *Boriomyia* but not necessarily to *nervosa* or *subnebulosa*; from his confused descriptions of the imago the possibility that a *Hemerobius* was comprised in his material is not excluded.

Strøm's paper is an entomological curiosity. From the historical point of view it may have a little interest and it is pleasing in its way as a record by a man who did his best by description and figures to give the results of his observations on some insects that had excited his profound interest. All the same, it is a groping effort and hardly worthy of serious consideration in the present connection. There is no reason for going out of the way and trying to invest it with a scientific value to which it has no claim.

I am sorry to dissent from Mr. Killington's view. My chief aim is to protest against what appears to me to be an unnecessary change. The figures which are given here, if compared with Killington's, may help others to form their own opinion in the matter. My own is unalterable. When it is sought to displace at this time of day a name used for a century, the rights of the new name should be established by proofs more flawless than those presented in this particular case.

My friend, Lt.-Col. F. C. Fraser, very kindly read over the preliminary draft of these notes and made some valuable suggestions to which I have given effect in the above. I referred to him believing that his opinion was less liable to be biassed than that of an entomologist specially interested in these insects, and perhaps, viewing the matter from a rather different angle, he might see in Strøm's figure and Killington's pleas for it, merit that I had failed to discover.

EXPLANATION OF FIGURES (Plate IV).

Larva of *Hemerobius betulinus* Strøm.

A.—From photograph (slightly enlarged) of Strøm's fig 2, Pl. V, in Nye Samling af det Kongelige Norske Videnskabers Selskabs Skrifter, pp. 387–389 (1788).

B.—The same much enlarged to facilitate comparison with Killington's fig. of the larva of *Boriomyia nervosa*.

13 Blackford Road, Edinburgh.
*January 31st*, 1935.

***Rhaphiochaeta breviseta* Ztt. *at Ross-on-Wye.***—Among some Tachinidae recently determined for me by Mr. C. J. Wainwright is a specimen of ***Rhaphiochaeta breviseta*** Ztt. taken by me at Ross-on-Wye on May 18th, 1931. The insect is a male, and the second British example. A female was taken by Professor J. W. Carr at Fiskerton, Notts, on June 14th, 1919 (C. J. Wainwright, Trans. Ent. Soc., 1928, p. 234; J. W. Carr, The Invertebrate Fauna of Nottinghamshire, Supplement, p. 153).—W. J. FORDHAM, Barmby Moor, Yorks: *February 19th*, 1935.

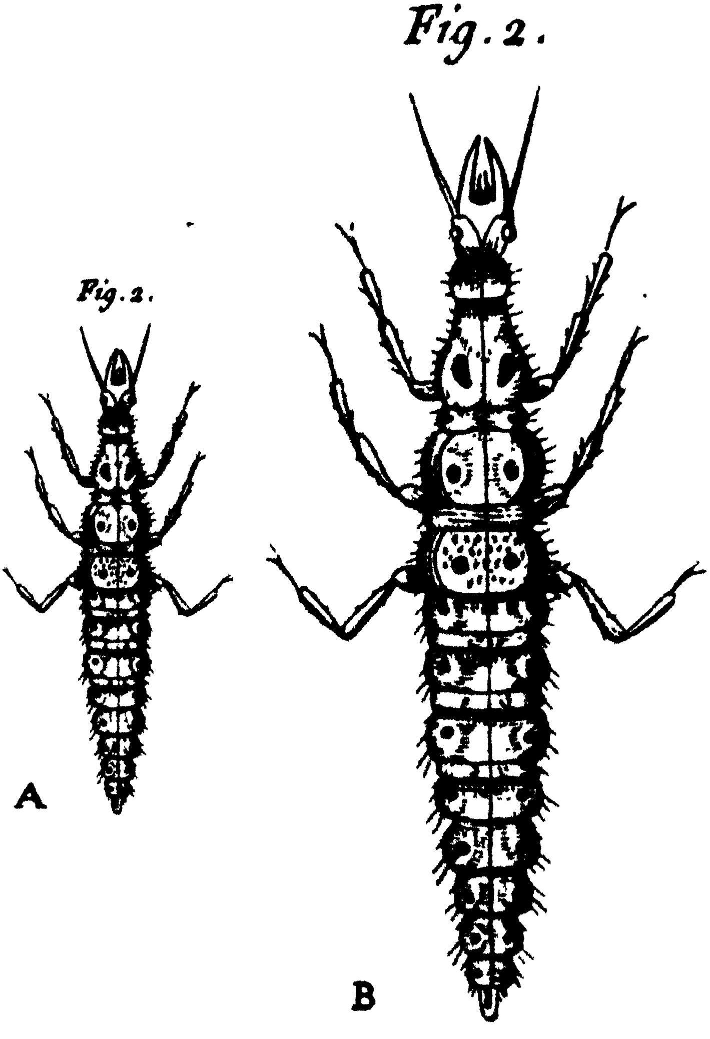


Fig. 2.
Fig. 2.
A
B

LARVA OF *HEMEROBIUS BETULINUS* Ström

# *ANTHONOMUS RUFUS* SCHON. (CURCULIONIDAE, COL.), A BEETLE NEW TO IRELAND.

BY HORACE DONISTHORPE, F.Z.S., F.R.E.S., ETC.
(Department of Entomology, British Museum, Natural History).

On March 24th last, when collecting near Ross Castle, Killarney, with Mr. E. Bullock, I suggested that we should beat some blackthorn bushes which were well in bloom. This we did and immediately took several specimens of *Anthonomus rufus* Schön. The flower heads, buds, etc., in the umbrella were taken home, and on searching these some more specimens were secured. Next day the same process was repeated and in all some fifteen examples of the beetle were taken.

At the time we suspected it was this species, and on my return home I verified the fact, working it out with des Loges's table. As there were no specimens in the British Museum, British or foreign, Sir Guy A. K. Marshall kindly compared the Irish insects with a single Continental specimen he possessed and further confirmed my identification.

This is of course a new beetle to the Irish list. In England it has only been taken at Fairlight, near Hastings, where it was first discovered by the late W. H. Bennett, who beat a single specimen off blackthorn on June 19th, 1892. It was not taken again until 1899, when Sir T. Hudson Beare captured a single specimen which was hibernating under ivy bark in the same locality.

The species was introduced as British by myself in 1900, my old friend Bennett having sent it to me to name. In 1931 Mr. J. R. le B. Tomlin records that several examples were beaten off blackthorn blossom in May, 1930, on Fairlight Cliffs.

*Anthonomus rufus* is found over the greater part of Europe, but appears to be decidedly rare.

## BRITISH LITERATURE.

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TOMLIN, J. R. LE B. Hastings and East Sussex Naturalist, **4**, 89 (1931).

British Museum (Natural History),
Cromwell Road, London, S.W.7.
*April 7th*, 1935.

## TWO NEW SPECIES OF AUSTRALIAN ELATERIDAE (COL.).

BY K. G. BLAIR, D.SC., F.R.E.S.

Amongst a number of Elateridae from Mackay, Queensland, sent by Mr. W. A. McDougall for determination are two species that appear to be undescribed. As Mr. McDougall is particularly anxious to have names for them they are now described as new.

### **Crepidomenus queenslandicus** sp. nov.

Blackish, nitid, without metallic sheen, clothed with a moderately dense sub-erect pubescence. Head rather coarsely and moderately densely punctate, the anterior margin narrowly raised. Thorax longer than wide, widest across posterior angles, thence sinuate, but sides nearly straight and convergent from a little in front of base; median sulcus fairly strong; disc finely and rather sparsely punctate, the punctures becoming larger and more approximate towards the sides; dorsal carina of posterior angles approximate to sides. Elytra subdepressed on dorsum, punctate-striate, intervals flat and finely punctate, two or three punctures across the interval; apex entire; hairs slender, recurved, with occasional long, straighter hairs intermingled. Length 10 mm.

Appears to be allied to *C. pulsi* Cand., but this is said to have the thorax 'fortiter punctato' and the elytral intervals 'grosse punctatis,' terms that do not apply to the insect before me. In some examples the base of the thorax and the posterior angles are markedly reddish and the elytra distinctly brown.

### **Megapenthes macdougalli** sp. nov.

Black, antennae and legs dark brown, pubescence moderately dense, black, stiff and sloping backwards. Head rather finely and densely punctate; antennae with the second and third joints equal, fourth and following triangular, subequal in length but becoming gradually narrower beyond the sixth. Thorax slightly longer than wide, widest across the posterior angles; sides feebly arcuate, not sinuate before base; carina of posterior angles diverging from margin; disc with feeble median furrow, finely, not very closely punctate, shining between the punctures; punctures larger and closer together towards the sides in front, but not umbilicate. Elytra rather broadly rounded at apex; striae fine and finely punctate, intervals almost flat, rather more finely and closely punctate than the thorax. Length 11 mm.

Allied to *M. rufipes* Cand., but less elongate, thorax shorter with sides less parallel, antennae and legs darker, punctures of outer striae towards base larger and encroaching upon the intervals.

British Museum (Natural History),
London, S.W.7.
*April 11th, 1935.*

## SOME SYNONYMIC NOTES IN THE FAMILY TENEBRIONIDAE (COL.).

BY K. G. BLAIR, D.SC., F.R.E.S.

In connection with a revised edition of his Catalogue of this family, Junk, Col. Cat., part. 15, 22, 28 and 37 (1910—1911), I have been asked by Herr Hans Gebien, of Hamburg, to publish the following synonymic notes already submitted to him in writing:—

p. 9. *E. reticulatus* Escal. Nov. 1914 preoccupied by *reticulatus* Reitt. Feb. 1914. I propose *E. escalerai* nom. nov. for *reticulatus* Escal. nec Reitt., = *rugosus* Kr. nec All.

p. 11. *Spirathus politus* Waterh. removed to *Arthrodosis* Reitt.

p. 25. *E. foveatus* Champ., *hogei* Champ., *incisus* Champ., *littoralis* Champ., all to *Bothrotes* Cas.

*E. nebulosus* F. (1781) (type in Glasgow University Museum) = *Pyanisia undata* F. (1792).

*E. ornatus* Champ. and *rorulentus* Champ. to *Bothrotes*.

p. 24. *E. aeneobrunneus* Curt. to *Epitragopsis* Cas.

*E. Batesi* Waterh. to *Hemasodes* Cas.

p. 26. *E. semicastaneus* Curt. to *Schoenicus* Lec.

p. 32. *H. mandibularis* Haag nec Er. = *gentilis* Geb. 1920 = *goetzelmanni* Chat. 1912.

p. 33. *Aprosphena* Reitt. 1916 = *Stenosida* Sol. 1835, but remains in the Epitraginae.

p. 34. *Afrinus* Fairm. = *Gynandrocera* Geb. 1920 = *Nerina* Lac., Gen. Col. V, 1859, p. 70, note.

*A. furcilabris* Fairm. = *N. dispar* Lac., loc. cit.

p. 39. *Z. nyctocharis* Redt. (type seen 1922) = *punctulata* Ol.

p. 43. *A. inermis* Fairm. (ex descr.) to *Syachis* Bates.

p. 52. *H. picipes* Gerst. to *Rozonia* Fairm.

p. 53. *Asph. septemcostatus* Fairm. = *costatus* Er.

*Asbolius* Fairm. = *Rhammatodes* Haag.

p. 63. *P. atra* Hbst. = *buprestoides* F. (*Hegeter*).

p. 64. *S. longipes* Kr. = *sulciceps* Gebl. 1841, which is distinct from *constricta* Stev.

p. 66. *R. cavernosa* Fairm. = *fossulata* Kr.

p. 67. *Sphaenariopsis* Kr. = *Pachycera* Eschsch.

*S. tristis* Kr. = *P. buprestoides* F. (*Hegeter*).

p. 69. *T. giraffa* All. = *palmeri* Crotch.

p. 84. *A. Drakii* Crotch = *dilatata* Klug.

p. 85. *A. epiphysoides* Péring. = *laevis* All.

p. 87. *A. Gerstaeckeri* Haag = *inaequalis* Fahr. nec *platynotus* Gerst.

p. 88. *A. scutulata* Péring. = *platynotus* Gerst.

*simplex* Péring. (ex. from Pretoria Mus.) = *Goryi* Sol. = *physosternoides* Haag (det. Péringuey).

p. 89. *S. cursoria* Haag = *gracilipes* Sol.

p. 94. *Z. jourdani* Sallé is a good species, =*mexicanus* Sol. nec Gray.
p. 94. *Z. variolosus* Sturm (type ex coll. Sallé in Brit. Mus.) = *nodulosus* Sol. (det. Champion).
p. 105. *Derosimus* Fairm. =*Rhypasma* Pasc. (p. 98).
p. 108. *S. pusillima* Fairm. =*Eutagenia tenuitarsis* Reitt.
p. 119. *Exangeltus* Blackb. should come in the Strongyliinae near *Dysgena* Mäkl.
p. 139. *S. platynotus* Perty is a somewhat aberrant *Pilobalia*.
p. 140. *G. affinis* Reed is the ♀ of *Kingi* Reed, which has priority.
p. 142. *N. longeplicata* Fairm. =*corrugata* Curt.
p. 143. *N. sulcicollis* Waterh. is a *Plectrascelis*.
p. 148. *P. decora* Blanch. (=*immaculata* Blanch. =*nebulosa* Waterh. =*oblonga* Blanch.) is a good species distinct from *decorata* Er.
p. 149. *Ametrocera* Fahr. should come in the Helopininae near *Oncopterus* Fairm.

British Museum (Nat. Hist.), S.W.7.
*April 15th*, 1935.

## A NOTE ON SOME BRITISH SPECIES OF *HALICTUS*.

BY R. C. L. PERKINS, M.A., D.SC., F.R.S.

For some years it has been known to myself and to some of my correspondents that two very distinct species have been included in British collections under the name *Halictus smeathmanellus* Kirb. Although it is not possible to assign a name to one of our species until Judge Blüthgen's work on the Palaearctic members of this huge genus is completed, since on the Continent there is a whole series of species closely allied to *smeathmanellus* and separable chiefly by characters of the ♂ genitalia, there are reasons why it is advisable now to call attention to this neglected species. In the table constructed by Saunders in his book on the Aculeates this would run to *H. morio* rather than to *smeathmanellus* and, in fact, was sent to me years ago from northern localities as representing *morio*. On our present knowledge it would appear to occur in Ireland,* Scotland, N. Wales, and the North of England, but further information is needed, as the species is variable and may include local forms or subspecies. It would seem that the true *smeathmanellus* of Southern England is rarely found in the range of the other. Of the former I have seen a number of males from York (Fordham) and two females (one much mutilated) from Ireland, the latter not typical specimens (one from Waterford, the other from Wicklow) and needing further study when more material is available. It does not seem possible that these Irish specimens could be referred as aberrations to the undetermined species, although that is widely distributed in Wicklow, for they agree with *smeathmanellus* in essential characters. The distribution of *H. morio,* so common in the South of England, is imperfectly known, since, as I have mentioned, the undetermined ally of *smeathmanellus* has been mistaken for it by some collectors in the North, and the very similar female of *leucopus* has been wrongly named *morio* from Ireland. I have seen many Scotch and Irish specimens of *H. leucopus.* The following table should make the separation of the species above-mentioned easy.

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* The Irish specimens examined by me were collected by A. W. Stelfox, the Scotch by K. J. Morton, those from N. Wales and Yorkshire both by A. E. Bradley and the late F. Smith.

1. ♂ tarsi largely whitish or yellowish; antennae short, the fourth joint at most slightly elongate and not much longer than the third.
   ♀ with the apical portion of the second tergite smooth and shining, with the surface sculpture wanting or very faint under a strong lens (× 20) ........... *leucopus* K.
   ♂ tarsi black; antennae long, fourth joint very elongate, much longer than the third.
   ♀ with the apical part (or apical impression) of the second abdominal tergite with very distinct and regular transverse striation of the surface under a strong lens (× 20) .... ...... .. ................................................... 2
2. ♂ ♀ mesonotum dull, densely and almost evenly punctured, the surface between the punctures appearing densely microscopically granulate (× 20) ................................ ...... ................................ *morio.*
   ♂ ♀ mesonotum often shining, more or less smooth between the punctures, or less evidently sculptured, the punctures frequently remote or irregular, some being much larger than the others ...................... ............. 3
3. ♂ clypeus black, not yellow-marked apically; ♀ abdomen for the most part black or only slightly metallic; propodeum with the wrinkles of the anterior area shorter, to a large or considerable extent apically with only microscopic surface sculpture ................................ . . . . ... sp.
   ♂ clypeus yellow-marked apically; ♀ with the abdomen conspicuously metallic, the anterior area of the propodeum rugose throughout . ......... *smeathmanellus* K.

It may be added that the males of these last species are very distinct by the form and clothing of the membrane of the lacinia of the genitalia and both sexes by the shape of the head and other characters.

With regard to the three metallic *Halicti* of the *tumulorum* group, in my table of the genus (E.M.M., 1922, p. 99) under numbers 2 and 3 of Group III, by a *lapsus calami* I wrote 5th for 6th ventral segment. Since that time, the species there called *flavipes* F. has been named *perkinsi* by Judge Blüthgen, who after examination of the types found that *flavipes* was a synonym of *tumulorum* L.

The species formerly called *flavipes* appears to me very similar to the N. American *H. provancheri* D.T., having similar ♂ genital characters, but Blüthgen considers them distinct. In my table of Group II (*l.c.*, p. 48) the genital characters there given for *H. 4-notatus* and *lativentris* should be transposed.

4 Thurlestone Road,
Newton Abbot, Devon.
*March 28th*, 1935.

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## NOTES ON WASPS. IV.

### BY G. E. J. NIXON, B.A.

The following account elaborates and traces to its conclusion an experiment similar to that which I described briefly in Note (ii). The object of the experiment is to show that a *germanica* queen will readily accept a *vulgaris* nest and, provided that conditions are such as will ensure her being tolerated by the *vulgaris* workers, will behave exactly as if she were among workers of her own kind and allow them to bring up her progeny.

Before describing in detail the experiment, it would be as well, I think, in order to avoid misunderstanding, to offer a few words of apology for the way in which I have interpreted manifestations of behaviour. In one instance I say that feeding the wasps appears to make them 'lazy.' I do not for a moment suggest that feeding them makes them lazy in the sense that we understand the word, but merely that it induces a change of behaviour, which, since it causes the wasps to cease doing what I expect them to do, I am inclined, for want of a better word, to describe as laziness. But to insist that this response to overfeeding were analogous to the condition which the same stimulus produces in the human species would be unscientific. I realise fully the inadequacy and limitations of interpreting behaviouristic phenomena in terms of my own sensations, but in an experiment of this kind, where methods of measurement are inapplicable and conditioning factors are largely uncontrolled, I know of no other way of meeting the difficulty.

On June 18th, 1934, at Eynsford, in Kent, I discovered a nest of *Vespa germanica* through spotting the queen as she disappeared into the ground. It contained five cocoons and about a dozen larvae of various sizes and was suspended from the roof of a fairly large cavity—doubtless the former home of a field-mouse—situated at the end of a tunnel some eighteen inches long. The nest was a badly-constructed affair, its outer cover carelessly made and containing a number of holes. I saw at once that the queen would have stood a poor chance of successfully establishing her colony.

The nest also contained two individuals of the parasitic Ichneumonid *Sphecophaga vesparum*. These made a clearly perceptible buzzing noise and were very unwilling to leave the nest. I caught the queen separately, as she returned from a foraging expedition. She was much discoloured. It may be of interest to remark that, in my fairly extensive experience of incipient wasp colonies of *Vespa germanica,* I have found that queens which are physiologically best equipped successfully to found a colony, *i.e.* those which construct well-shaped nests and actively tend their broods, generally retain their bright yellow markings much longer than such queens as the one I am dealing with now. When I arrived home, I suspended the nest without its outer cover, by means of a piece of fine wire and a short stick, across a small cardboard box. When I allowed the queen access to her family I provided her with a small tin-lid of syrup. I also gave her some building material, of which I never saw her make any use. Occasionally I gave her ant-grubs, which she readily accepted and fed to her larvae.

During the period of seven days when the queen was attending her brood alone, the larvae grew much too big for their cells, which she made no attempt to enlarge. On the 19th, the day after her capture, I allowed her to leave the nest. She flew out of the second storey window, after having carefully taken her bearings, but instead of returning immediately, as is invariably the case with queens under such circumstances, she was away for nearly three-quarters of an hour. She eventually found her way in through the window, but as her memory failed to help her after she had accomplished this, I caught her and let her run into her box. By the evening of the 19th, she had learnt to fly without difficulty to and from her nest, which was placed on a table some five feet from the window and in a somewhat darkened corner of the room. She rarely left, since she showed but little inclination, or from other causes no aptitude, either to increase the size of her cells or to build an outer cover for the comb, and food was supplied in plenty.

On June 24th, I found a nest of *V. vulgaris*. It already contained a second tier with some twenty half-grown larvae. There were six or eight workers flying and three callows. Two of these callows I gave to the *germanica* queen. When the first one was placed on the nest, she became very excited and made nervous attempts to attack it, though her behaviour suggested defence rather than definite aggression. The worker, however, could not be driven from the tiny comb and sometimes would seize the queen by a leg and hold on grimly. When attacked in this way, she either remained passive or tried to drag herself free. Cessation of hostilities soon ensued and the queen began to show what I interpret as pleasure or evident satisfaction in the presence of the callow worker. She also quickly accustomed herself to the second worker, a more advanced callow, which like its sister harassed her a little at first. The next day, the three of them moved about, and tended the brood, harmoniously together. I then decided to give the queen the nest from which her two foster-workers had been taken. This nest I had placed in the summer-house. It had five foraging workers and the queen. While all except one of these workers were out, I removed the nest and put in its place another *vulgaris* nest, which had three or four workers and a strange queen, which I had caught, and introduced to it after clipping her wing. The rightful queen of this latter *vulgaris* nest had escaped when I dug it out on June 17th. When the workers from *vulgaris* nest No. 1 returned, they found a strange queen and workers. They harassed the queen from time to time and there was some hostility between themselves and the other strain of workers, as a result of which one worker was stung and soon died. In two hours, however, the two strains of workers and the queen, who was parent of neither, showed every sign of being happily united.

I must return to the *germanica* queen and her proposed new family. The *vulgaris* nest which she was to receive had, as I have already mentioned, a queen of its own. This latter I removed. Her subsequent history was interesting, if tragic, and will form the subject of a later note.

The difficulty now was to induce the *germanica* queen, without frightening her, to leave her nest, an act which she seemed always very reluctant to perform. Nevertheless, I seized the opportunity when she crawled from the comb to feed from the syrup. By gently worrying her with the point of a stick, I was able to make her take to wing, without letting her realise too obviously that her home had disappeared. Perhaps I should say that the syrup was only about an inch away from the comb. The queen flew around and tried to get back to the box, but I prevented this until I had substituted the *vulgaris* nest for her own. She flew at once to the new nest. The change had been accomplished without my having agitated the queen beyond the initial act of forcing her to leave the box. At first she seemed nervous, but showed absolutely no inclination to desert. I then gave her the two *vulgaris* workers and an hour or two later, when she had quite settled down, I clipped one of her wings. During the interval between her introduction to the nest and the clipping of her wing, she was quite free to desert had she so wished, for the box remained uncovered.

*June 26th.* Four workers have hatched since yesterday and the entire worker population, which now numbers six, runs about the nest in a state of feverish excitement. The two original callows fly to and from the nest, but not much. They have made no attempt to construct an outer cover, the very absence of which is probably responsible to a large extent for their unwillingness to leave the nest to forage. Another contributing cause is no doubt the constant supply of syrup. Only the two flying workers have access to this source of food and it seems to make them lazy. But to remove it would be disastrous, for alone, these two workers could never support the relatively very large larval population and the hatching callows. The queen does not seem quite at ease, and I usually see her resting on the periphery of the upper comb, whereas I should have expected her to hide herself in the central part between the two combs. Her abdomen is never fully distended with food as it undoubtedly would be if she were with her own workers, but from time to time I see her solicit a drop of fluid from the larvae. The urge to oviposit seems to be strong in her, for she frequently inspects the most recently constructed cells. But frustration always baulks her impulse, for the original *vulgaris* queen had left an egg in each cell and the workers make no attempt as yet to increase the size of the comb. There is one shallow and badly-made cell in which she often tries to lay an egg, but as the tip of her abdomen keeps slipping out when she has adjusted herself for the operation, she is obliged to give up.

*June 29th.* The worker population is still too small to give any impetus to the growth of the nest. The queen still rests, fully exposed, at the edge of the upper comb. I notice that occasionally a *vulgaris* worker will bite at her head and abdomen, but this harassing is never continuous and is not, it seems to me, of a very hostile nature. It looks as if the workers are quite resigned to accept the queen, though their behaviour suggests that they submit with an ill grace.

*July 8th.* The nest is now in a flourishing condition and the wasps have constructed a complete outer cover. By lifting the stick I see that a third tier has been commenced, which consists of six cells with an egg in each. There is a marked increase in the weight of the nest, which is now roughly the size of a cricket-ball.

On July 11th, I saw that the queen had fallen from the nest and was crawling about in the box in an exhausted condition. I picked her up in my fingers, but she was too feeble to cling to them. When I placed her on top of the nest, she immediately recognised it and clung on for dear life. But the lower convexity was too much for her, so I lifted up the nest by means of its supporting stick, and by tilting it, was able to guide the queen, dusty and very shaky, to the opening, through which, aided by gentle pushings from behind, she struggled. Fortunately, her bulk blocked the narrow entrance sufficiently effectively to prevent any workers from coming out. The almost certain explanation of the accident is that the queen fell from the nest when she crawled through to the outside in order to void her excreta. I have noticed that queen wasps invariably excrete *outside* the nest while it is still small. On July 13th, I removed a piece of the outside cover about the size of a penny. Every peripheral cell, however small, contained an egg. I saw the queen as she passed round the edge of the upper comb. The active way in which she was examining the cells and the distended state of her abdomen suggested to me that she had quite recovered from her previous misadventure. By July 18th, the colony was in a very flourishing condition and there was nothing whatever in the behaviour of the workers to suggest that the queen was any other than pure *vulgaris*. By July 22nd, the *germanica* workers had begun to hatch. On this day I removed five dying callows from beneath the nest. Four of these had the abdomen chewed completely off. There was absolutely no change in the activity (outside the nest) of the *vulgaris* workers. I made a hole in the cover and saw one *germanica* callow being worried by a *vulgaris,* but another seemed to be in good condition, for its abdomen was distended with food, and it moved about freely among the *vulgaris* workers.

By July 23rd, the *vulgaris* had come to tolerate the *germanica,* for I saw no more dead of the latter.

On August 1st, the workers were nearly all *germanica,* and their grey paper, which had been added extensively to the lower half of the nest, contrasted sharply with the more closely-constructed, brown, imbricated scales of the *vulgaris*. The *germanica* were decidedly variable in size. By August 14th, the nest was pure *germanica,* and its subsequent development was that of an ordinary colony of this species. Eventually two queen combs, each about eight inches in diameter, were produced. I should mention that the queen gave rise to a very active and industrious strain of workers.

From the above experiment I do not infer that *germanica* colonies may from time to time be founded by initial parasitism of *germanica* queens in the nests of *vulgaris*. The necessary conditions which could make this possible are not often likely to be found rightly co-ordinated in a state of nature. But that such conditions can and do occur, I know from experience, for on one occasion I found a thriving *vulgaris* nest with a *germanica* queen in possession, though in this instance neither the size of the nest nor the number of workers was incompatible with the assumption that the queen had usurped the nest before the hatching of the workers and either had found it untenanted as a result of accident to the *vulgaris* queen or had killed the original foundress herself. The former is, in my opinion, by far the more probable explanation. The stages by which this nest developed into a pure *germanica* colony agree, in so far as they concern initial hostility towards, and final acceptance of, the *germanica* callows by the *vulgaris* workers, exactly with what I have described in my own experiment.

Department of Entomology, Brit. Mus. (Nat. Hist.),
Cromwell Road, S.W.7.
*February 7th,* 1934.

*Additional recorded localities of Gnypeta coerulea Sahlb.*—By the courtesy of Dr. W. J. Fordham, who was responsible for the habitats in Dr. Joy's 'Handbook of British Beetles,' I am enabled to amplify the records in my notes on *G. coerulea* (*antea,* p. 54) with the following localities, *viz.*:—Garve, Ross-shire (*Dr. Joy*); Northumberland and Durham (*Hardy* and *Bold*); Westmorland (*F. Day*); Middleton-in-Teesdale, July, 1911, and Bishopdale, July, 1913 (*W. E. Sharp*); Scalby, Scarborough, July (*W. Hey*); Ingleborough, moss in stream, 'Naturalist,' 1913, p. 401, and Ingleton, June, 1914 (*E. W. Morse*); Gaping Ghyll (*G. B. Walsh*); Charlton, Lancashire, and Bollin, Cheshire (*H. Britten*); Derby (*J. T. Harris*), Fowler's Coleoptera, v. II, p. 143; Glamorgan, 'Ent. Rec.', xxviii, p. 256 (*B. Tomlin*); the Cornish Coast, Dr. K. G. Blair, in Proc. Zool. Soc., 1931, on the authority of E. A. Butler (Blair, The Coleoptera of the Scilly Isles and Adjacent Districts).—JAMES H. KEYS, 9 Hillside Avenue, Plymouth: *April 8th,* 1935.

*A new Irish beetle, Malthodes guttifer Kies.*—On April 22nd, 1934, Mr. A. W. Stelfox collected some oak sticks in Clara Oak-wood, Co. Wicklow, and on June 4th found that some specimens of *Malthodes* had emerged. These proved to be of two species, *M. guttifer* Kies. and *M. flavoguttatus* Kies.; the former species is not recorded as an Irish insect and the latter is very local and not hitherto known from the Co. Wicklow. I am indebted to Dr. K. G. Blair for the determination of *M. guttifer* and to Mr. P. Harwood for verifying my naming of *M. flavogattus*.—EUGENE O'MAHONY, National Museum of Ireland: *May 4th,* 1935.

*Calosoma schayeri Er. introduced into Ireland.*—On February 9th, 1927, Mr. M. S. D. Westropp brought me a living example of *Calosoma schayeri* Er., which he found in the packing round a parcel he had received that morning from near Adelaide, South Australia. I am indebted to Dr. K. G. Blair for the identification of the beetle and for information regarding its distribution. The species occurs throughout Australia, and Dr. Blair says he does not remember a previous case of this species having been imported alive into the British Isles.—Eugene O'Mahony: *May 4th*, 1935.

(*Calosoma schayeri* Er., which resembles in general appearance a rather small *C. sycophanta* L., is a common species in most parts of temperate Australia, occurring also in Tasmania, and is represented on the tropical north-west coast by the larger *C. walkeri* Wat. I have found *C. schayeri* in large numbers at Sydney in summer, on the ground under the electric street lamps after dark.—J.J.W.)

*Trogophloeus schneideri Ganglb. in Dumfriesshire.*—It may be of interest to record the capture of three examples of this rare beetle near Gretna on the Scottish side of the Solway. The first was taken from flood refuse near the mouth of the River Kirtle on April 8th, 1931. Last year I obtained two more by beating long grass overhanging a creek on the marsh here, the precise date being the evening of September 11th, 1934. This locality is a few miles east of where Mr. Day discovered it in Cumberland on the opposite side of the Solway. Its small size and sluggish movements make its detection rather difficult. My specimens have been compared with one from Cumberland.—Jas. Murray, 6 Burnside Road, Gretna: *March 21st*, 1935.

*Notes on the emergence of Pyrochroa coccinea L.*—In 1932, while staying at Ferring-on-Sea, I found some larvae of *Pyrochroa* underneath the bark of a part of the trunk of a felled elm. With these larvae, unknown to me at the time, I had included two larvae of some Buprestid in the bark and sub-cortex I had brought home to feed the larvae on. In a very short time all the *Pyrochroa* larvae had been eaten. Thus I was very pleased to find a further batch under the bark of a piece of oak at Broad Oak, near Rye, in Sussex, last Easter (April 5th, 1934).

Many larvae were apparently fully fed, and the first pupa was observed on April 21st, a second on the 23rd, the third on the 29th, and the fourth and fifth on May 1st.

During the observations that follow it was noticed that the pupae were extraordinarily active, and seemed capable of travelling halfway across the tin box they were kept in—a distance of several inches. Later it was observed, under the microscope, that each abdominal segment of the pupae was armed with a series of hook-like spines arranged in pairs pointing towards the anal segment. It would seem that in the confined burrows of the sub-cortex the leverage obtained from these spines would be ample to account for considerable movement. These spines were, of course, shed with the pupal skin. The sixth and seventh pupae were noted on May 3rd and 5th.

9.v.34.—One pupa shows a dirty grey coloration of the elytra and knees, while the first joint of the antennae are black. The thorax has also taken on a darker hue.

10.v.34.—Morning. Pupa shows a general darkening of the legs, elytra, and the area of the spiracles.

Evening. Pupa, except for the abdomen, has taken on a muddy hue, and even the latter shows dark marks on the anal segment and the spiracles.

11.v.34.—Morning. Pupa very active. Legs seem freer and capable of some movement, being jet black. Abdomen more extended, and has altered shape from flat-oval to cylindrical.

Evening, late. Beetle already emerged; colouring apparently complete, save for elytra, which are milky-grey. Second pupa about to emerge.

Midnight. Pupa pulsating regularly and finally extended head forwards. Although no rupture of pupal skin was observed, elytra appeared to grow downwards from the shoulder, and after ten minutes the insect was almost free, save for the last two or three abdominal segments. Then the intermediate and posterior legs and tarsi were used to smooth out the elytra, which were of a milky colour, their pubescence being very noticeable. The tarsi finally were used to assist in the complete removal of the pupal skin.

12.v.34.—Morning. Elytra of last insect referred to have a faint pinkish tinge.

I kept each insect at least a week before killing it, to ensure it becoming quite hard. and found that it took at least three days for the elytra to come to full colour.—H. R. P. Collett: *February 23rd*, 1935.

*Hemiptera-Heteroptera in* 1934.—During the past year I have given more attention than usual to collecting the above Order, and perhaps the result of my efforts may be of some little interest.

A visit to Deal at Easter was unsuccessful, the weather being bitterly cold. The only species of any interest that turned up was a single *Ceraleptus lividus* Stein, which occurred at the roots of marram grass.

The New Forest at Whitsun proved more profitable, *Pachycoleus rufescens* J. Sahlb. being found in *Sphagnum* in large numbers; with it was obtained a short series of *Orthaea lurida* Hhn., whilst in a pond near Denny a single macropterous specimen of *Hebrus ruficeps* Thoms. was a most welcome capture. On June 3rd *Eusarcoris aeneus* Scop. occurred in numbers by sweeping in a grassy ride in the New Forest, together with a few *Neottiglossa pusilla* Gmel.; and a nice series of *Oncochila simplex* H.-S. were obtained on the wood-spurge (*Euphorbia amygdaloides*). I am indebted to Mr. Philip Harwood for introducing me to the locality for these three species.

*Metatropis rufescens* H.-S. was obtained sparingly on its food-plant, the Enchanter's Nightshade (*Circaea lutetiana*), in a wood near Kingsfold, Surrey, at the end of June, and also under similar conditions near Pulborough early in July.

At Chobham, Surrey, on July 22nd, *Cymus melanocephalus* Fieb. was not uncommon, and on the 26th I was delighted to obtain a long series of *Dictyonota fuliginosa* Costa. on old broom bushes in the same locality; with it was *D. strichnocera*, and I was very surprised to note as many as five males of the former species in cop. with female *strichnocera*. Moreover, I saw no *fuliginosa* in cop. with its own species, although females were as numerous as males.

On August 5th a few hours collecting at Worlington and Freckenham, Suffolk, was not unprofitable; a sandy spot provided *Sehirus luctuosus* M.R. abundantly. *Aelia acuminata* L., *Corizus parumpunctatus* Schill. and *Pseudophloeus fallenii* Schill. were not uncommon under *Erodium*; with the latter were three examples of the scarce *P. waltlii* H.S. *Verlusia rhombea* L. was numerous in the nymph stage, but only one adult was obtained; *Neides tipularius* L. and *Dicyphus globulifer* Fall. were scarce. Another visit to the same spot a fortnight later resulted in the capture of twelve more *P. waltlii* H.S., two macropterous *Coranus subapterus* De G., *Aphanus lynceus* F., *Metacanthus punctipes* Germ. under *Ononis* in plenty, *Berytus crassipes* H.S. in vast numbers (Butler records this as usually occurring singly), *B. minor* H.S., and a long series of *B. clavipes* F., including three macropterous specimens. No specimens of *Verlusia rhombea* were to be found in spite of the number of nymphs seen a fortnight earlier. *Dictyonota tricornis* Schrk. was also not uncommon.

On September 10th I again visited the New Forest, where *Eusarcoris aeneus*

Scop. was very abundant in the same spot as before, together with three specimens of *Aphanus pini* L. and a single *Stenocephalus medius* M.R.; *Pentatoma prasina* L. and *Picromerus bidens* L. were common on birches, and *Dolycoris baccarum* L. on thistles.

Two further specimens of *Pseudophloeus waltlii* H.S. were found at Freckenham on September 14th, with *Chlamydatus pullus* Reut. and *C. saltitans* Fall. Two days later three specimens of *Eurygaster testudinarius* Geoff. were swept in Wicken Fen.

On October 27th *Berytus signoreti* Fieb. was met with sparingly at Cranborne, Dorset, and on the following day Mr. P. Harwood took me to a small wood near Blandford, where *Nabis apterus* F. was not uncommon on hazels; all were females and eight of the macropterous form were secured. *Pantilius tunicatus* F. and *Acanthosoma haemorrhoidale* L. were the only other species seen.—E. C. BEDWELL, 54 Brighton Road, Coulsdon, Surrey: *March 13th*, 1935.

*Note on Birds and Butterflies.*—During the summer of 1932 it was decided to try and establish certain native butterflies at Whipsnade. With this end in view, large numbers of the commoner kinds, such as Tortoiseshells, Peacocks, etc., were purchased and liberated in the flower garden in front of the main restaurant at Whipsnade. There are large numbers of house-sparrows which live and nest in the ivy on the front of the restaurant, and within a very few hours, practically all the butterflies were taken by them. They took them both sitting and on the wing. On other occasions, I have seen both swifts and swallows take butterflies.—G. M. VEVERS, Whipsnade: *March 20th*, 1935.

## Society

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON: *Wednesday, March 6th*, 1935.—DR. S. A. NEAVE, O.B.E., President, in the Chair.

The following were elected Fellows of the Society: George Edward Hyde, 20 Woodhouse Road, Doncaster; Lionel Gilbert Ollyett Woodhouse, The Surveyor General's Office, Colombo, Ceylon.

The death of Mr. J. D. Ward, elected a Fellow of the Society in 1910, was announced.

The President said that he had great pleasure in announcing that, thanks to the munificence of Mr. R. W. Lloyd, the Society had just acquired a unique collection of the works, both printed and in MSS., of Jacob Hubner, as well as many original drawings. He asked the Treasurer, who was an acknowledged expert on Hubner's work, to describe some of the more interesting items to the meeting, and proposed a very sincere vote of thanks to Mr. Lloyd for this further evidence of his extraordinary generosity towards the Society, and this was agreed unanimously.

The Treasurer then gave some account of the collection, a report of which will appear in the Proceedings.

Dr. K. G. Blair exhibited and discussed (1) larvae of *Nacerdes melanura* L. from piles of pitch-pine; (2) some ancient beetles from Egypt and Mesopotamia; and (3), on behalf of Mr. Claude Morley, beetle remains from the peat of the Forest-bed series (Pliocene), Suffolk coast. Sir Edward Poulton, F.R.S., exhibited and discussed a remarkable Dipterous mimic of a Hymenopterous model (*Thynnidae*) discovered by Mr. L. Glauert on Rottnest Island, West Australia. Professor G. D. Hale Carpenter exhibited and described a fine series of *Acraea althoffi* from Uganda, including a form probably undescribed. Dr. K. Jordan, F.R.S., exhibited and discussed (1) a variable series of specimens of the Noctuid *Sinna calospila* from Java, and (2) two African *Agaristidae*. Dr. L. G. Higgins exhibited and described some uncommon butterflies. Mr. G. Fox-Wilson reported a new record of Vine *Phylloxera*, illustrating his remarks with lantern-slides. Mr. C. Rippon described a method of photographing insects in proportion to sizes, illustrating his remarks with lantern slides.

The following papers were read: 'Location of olfactory receptors in insects —review of experimental evidence,' by J. Marshall; 'A contribution to the classification of the Coleopterous family Lucanidae,' by G. J. Arrow; 'Supplementary notes on the structural characteristics of *Pyrgus freija* (Warren, 1924) (Lep. Hesperiidae),' by B. C. S. Warren.

*Wednesday, March 20th,* 1935.—DR. S. A. NEAVE, O.B.E., President, in the Chair.

The following were elected Fellows of the Society: Mahmoud Effat, Beni-Swaif, (Halabiyah), Egypt; Albert Reginald Daniel, Alwyn, Dove House Lane, Solihull, near Birmingham; John Stainer, Endcliffe, Henbury, near Bristol; George Loftus Windred, B.Sc., Colonial Sugar Refining Co., Lautoka, Fiji.

The death of Professor W. Benham, F.R.S., elected a Fellow of the Society in 1915, was announced.

Sir Edward Poulton, F.R.S., exhibited and discussed (1), on behalf of Miss E. A. Oehlenschlaeger, the white Arctiid Virginian Tiger-moth refused by young Purple Martins; and (2), on behalf of the Rev. E. G. Bucknill, notes on Japanese insects. Dr. V. B. Wigglesworth discussed the regulation of moulting and 'metamorphosis' in *Rhodnius prolixus*. Mr. G. C. Varley exhibited and discussed a new Syrphid larva and some other aquatic insect larvae which obtain their oxygen from plant roots, illustrating his remarks with lantern-slides.—A. W. MCKENNY-HUGHES, *Hon. Secretary.*

## NEW SPECIES AND FORMS OF AFRICAN LYCAENIDAE (LEP. RHOP.).

BY G. TALBOT, F.R.E.S.

*(Continued from p. 78.)*

### 26. **Pseudaletis clymenus subangulata** subsp. nov.
### (Pl. I, Fig. 13; and Pl. III, Fig. 7.)

♂. Forewing above with the white area only slightly excised below vein 2, and gently rounded between vein 3 and the submedian fold. In typical Cameroons examples the white area in 2 projects strongly distad. Hindwing anal black, not reaching vein 3.

Underside of forewing with paler fuscous markings extending over the outer margin, and the post-discal stripe divided by a thin white line. The white ground-colour reaches the margin between vein 2 and inner margin, and forms a narrow marginal extension to beyond vein 3. Hindwing with a post-discal fuscous line from the costa near apex to vein 2 or before it, and sometimes a thin submarginal line which does not reach the apex. Anal yellow pale and of less extent.

♀. Resembles the ♂, but is much larger. Forewing above with a white line or band crossing the distal black area, and sometimes connected in cellule 2 with the proximal white area. The anal yellow area on the hindwing below is deeper in colour and more extensive than in the ♂.

*Hab.*—SIERRA LEONE: Regent, about 3 miles south-east of Freetown, 24.x.1911, 2 ♂♂ (*Lieut. C. A. Foster*) (type). Also in the B.M. from Freetown, 8 and 12.ix.1899, 2 ♀♀ (*E. E. Austen*); Sierra Leone (*ex Coll. Crowley*), 4 ♂♂, 2 ♀♀.

### 27. **Hypolycaena liara plana** subsp. or f. nov.

(Pl. I, Figs. 14 and 15.)

♀. Upperside of forewing with two oblong white discal patches in 2 and 1*b*. On the hindwing the white distal area between the submedian and vein 6 is wider, and the veins crossing it white-scaled.

♂. Upperside of hindwing without a transverse line, and greyish-blue area extended to vein 6. Underside as in typical form.

*Hab.*—N.E. RHODESIA: Mouth of the Chambezi to Mansya River and Lake Young, 4,500 ft., 25.x.1908, 1 ♀ (*S. A. Neave*) (type H.T.); id., 1 ♂ (type A.T.); Lake Chambezi Valley, Kasama district, 3,900 ft., 7.v.1908, 1 ♂ (*S. A. Neave*). Luwingu to mouth of Chambezi River, 1908, 4 ♂♂ (*S. A. Neave*); id., in B.M., 2-23.x.1908, 3 ♂♂, 1 ♀ (*S. A. Neave*). Also in B.M. from the first locality above mentioned, Oct. 22—Nov. 5, 1908, 2 ♂♂, 1 ♀. N.W. RHODESIA: Alala Plateau, Mkwhi district, 1905, 1 ♂ in the Hope Department. Damba Island, Sese, L. Victoria, 16-30.vi.1911, 1 ♀ (*G. D. H. Carpenter*).

### 28. **Hypolycaena buxtoni** ♀ f. **divisa** f. nov.

(Pl. I, Fig. 16.)

In this form, which approaches *spurcus* Talb. (1929), the white discal area of the forewing is divided by a curved dentate and heavy line of ground-colour into a somewhat rounded discal patch and a short post-discal band.

*Hab.*—N.E. RHODESIA: Lake Young to Mpika, 6.v.1908, 1 ♀ (*S. A. Neave*) (type); N.E. Rhodesia, 3 ♀♀. S.E. RHODESIA: Gazaland, 1 ♀. Also in the B.M. (*Coll. Joicey*) from the S.E. Congo.

### 29. **Stugeta bowkeri nyasana** subsp. nov.

(Pl. I, Fig. 17; and Pl. III, Fig. 6.)

♂ ♀. Upperside of forewing with larger and more distinct white markings than in the typical South African race. The spot outside the cell end and the discal spot in 2 are resolved into white patches. There is no spot in cellule 3. The ♀ has usually a spot below the one in 2. Hindwing much as in the typical form, but the white stripe in 6 is larger and more distinct.

Underside of forewing with very broad discal and post-discal bands; in 3 and 4 the band reaches the submarginal line. On the hindwing the post-discal band above vein 2 is thinner than in the typical form, but the costal patch is large.

*Hab.*—NYASALAND: Maiwale, 12 miles east of Fort Johnston, 3,200 ft., rather thick bush, 25.ii.1923, 2 ♂♂, 2 ♀♀ (types); id., 18.ix.1925. TANGANYIKA TERRITORY: Itigi, 28.vi.1917, 1 ♂. Also in the B.M. from various localities in Nyasaland in February, March, April, May, July, September, December, and from 2,300—4,000 ft.

### 30. *Pseudiolaus poultoni* Rly. ♀.

(Pl. II, Figs. 1 and 5; and Pl. III, Figs. 8 and 9.)

♂.—Riley, Nov. Zool. 34, p. 392 (1928) (Kenya).

The female of this interesting species closely resembles on its upperside the female of *Epamera aemulus* Trim., which occurs with *poultoni* in the Mombasa district.

Upperside of forewing with the white area somewhat ovate and not reaching the base. This area is sharply defined except on its proximal and lower edges, where it is nebulous and merged in the greyish-blue basal area; it almost fills the cell, leaving a small patch of ground-colour at the upper angle and sometimes a discocellular mark; it fills the base of cellule 4, the basal third of 3, and most of 2 where it slightly projects, fills the greater part of 1*b*, and reaches the submedian at the middle, and in the Itigi specimen the inner margin. Hindwing with large white distal area between cell and margin, and veins 2 and 6. This area is triangular with apex at the base of cellule 4. The proximal edge of this area is only slightly defined from the bluish-grey proximal area. A small proximal part of the white area is cut off by a fuscous zig-zag line from vein 5 to 1*b*. An ovate fuscous marginal spot in 2, an oblong one in 1*c*, and a round black spot on the lobe; these spots with yellow proximal border which, in 2, is wider than the spot. Costal area fuscous. A fine marginal fuscous line from apex to the anal lobe, and a thick antemarginal line. A heavy submarginal line formed of three bars in 3—5. Fringes white, on the forewing fuscous at the base.

Underside as in the ♂ except that on the forewing the post-discal lines are more curved and there are no dark discal scalings. On the hindwing the post-discal line is more sharply angled between veins 2 and 4, and the antemarginal line heavily marked.

The specimen from Itigi shows reduced black markings. The post-discal line on hindwing is weakly marked, and the submarginal line is absent.

Expanse, 29—36 mm.; length of forewing, 17—20 mm.

*Hab.*—KENYA: Sagalla Mtn., ca. 3,500 ft., ca. 100 miles west-north-west of Mombasa, 29.xii.1916 (*K. St. A. Rogers*) (neallotype); id., 30.xii.1916, 1 ♀; Mombasa, 14 miles north-west of Rabai, ca. 700 ft., 6.iv.1912, 1 ♀ (*K. St. A. Rogers*). TANGANYIKA TERRITORY: Itigi, about 150 miles east of Tabora, 34° 30′ E., 5° 45′ S., 4,278 ft. (wet season to about May 25th), 4.iii.1917, 1 ♀ (*G. D. H. Carpenter*).

### 31. *Epamera aemulus* ♀ f. **apatosa** nov.

(Pl. II, Fig. 4; and Pl. III, Fig. 11.)

The upperside pattern closely resembles the ♀ of *Pseudiolaus poultoni* which occurs with it.

Forewing with large white discal area and small bluish-grey basal area, the rest fuscous. The white area extends into the cell to vein 2, and is limited anteriorly by the cell and vein 6. It is slightly incurved between veins 6 and 4, and its outer edge is slightly curved to the inner margin, where it is about 2 mm. from the tornus. Hind-wing mostly white. Costal area to vein 6 fuscous, but some white scaling in 6. Outer margin narrowly bordered with bluish-grey and bearing a black marginal line. Within the bluish border is a black marginal spot in 1c and 2. Anal lobe black. The underside markings show through slightly. Fringes pale fuscous on the forewing, white on the hindwing.

Underside as in the typical ♀, compared with a single specimen in B.M.

The species appears to be very rare.

*Hab.*—KENYA: Chalani, near Mombasa, ca. 600 ft., ca. 15 miles north of Rabai, 9.vi.1911, 1 ♀ (*K. St. A. Rogers*).

### 32. **Epamera tajoraca haemus** subsp. nov.

(Pl. II, Fig. 2; and Pl. III, Fig. 17.)

Allied to the race *ertli* Auriv.

♂. Upperside with lustrous blue areas. Forewing with blue proximal area not extended beyond end of cell and only slightly into the base of 2. Hindwing with black outer border. Fringes of both wings black.

Underside fuscous-black, the lines dark red. On the forewing the post-discal line is nearly parallel to the submarginal line. Hindwing without any darker apical patch, otherwise marked as in *ertli*.

*Hab.*—KENYA: Mount Elgon, south-east slopes, 18 miles south-west of Kitale, 6,700 ft.; bred in October, 1933, by T. H. E. Jackson, 1 ♂ (type); id., July, 1933, 2 ♂♂.

### 33. *Epamera aphnaeoides nasisii* Rly. ♂.

(Pl. II, Fig. 3.)

♀.—Riley, Nov. Zool. 34, p. 391 (1928) (Kenya).

We place this specimen provisionally with *nasisii* from Kavirondo.

♂. Upperside more resembles the typical S. African form than it does *diametra* Ksch. from Kenya. No white markings on either wing. On the hind-wing the black outer border is continued to the anal lobe, and is only interrupted by blue on vein 2, with a slight projection at vein 3.

Underside of forewing without black submarginal dots or with only a few black scales. On the hindwing the yellow discal band is joined posteriorly to the post-discal band; this occurs sometimes in specimens of *diametra*.

*Hab.*—S.W. UGANDA: Kigezi district, Ruanda country, eastern escarpment of Rift Valley, Behungi, ca. 8,300 ft., 8.ix.1921 (*G. D. H. Carpenter*), 1 ♂ (neallotype).

### 34. **Aphnaeus coronae** sp. nov.

(Pl. II, Fig. 7; and Pl. III, Fig. 10.)

This species is probably more nearly allied to *neavei* B.-Bkr., which resembles it in the arrangement of the spots on the underside. On the upperside its blue pattern approximates to *brahami* Lathy.

♂. Upperside ground-colour brownish-black with blue markings. Forewing with a blue inner area which touches the margin and vein 2, extends proximad to shortly before vein 2, and distad to within 2 mm. of the outer margin. This blue area is slightly rounded distally and is narrower on the inner margin; some scattered scales connect it with a blue basal area. Three small cell-spots—one near the base, one at the middle, and one on the cross-veins. A discal dot in 3, a larger one in 6, a minute dot in 5, and a few scattered blue scales in 2. Hindwing with a triangular blue discal area. The inner edge of this area extends slightly into the cell, the anterior edge reaches vein 5, the posterior edge reaches a little below vein 2, the outer edge reaches to within 2 mm. of the outer margin at vein 4 and to within about 1 mm. at vein 2. A blue stripe in 1*c* behind the fold, not reaching the margin. Anal area with rufous scaling at the margin between 1*a* and 2, tail black. Fringes grey-white, fuscous at the veins.

Underside ground-colour grey-brown with a reddish tinge, darker than in *neavei*. Forewing with eight silvery spots placed somewhat as in *neavei*. An oblong one near base of costa, a somewhat rounded one in base of cell, a large oblong one in middle of cell, and a larger and similar one across end of cell. A subapical spot, narrow and curved, from subcostal to vein 5. A round spot placed near the margin in cellule 4, nearer the margin than a similar spot in *neavei*. Between veins 2 and 4 a narrow discal spot, slightly 8-shaped, and lying below the subapical spot. Below this a narrow curved stripe with its proximal end placed about midway on vein 2, and its distal end curved down to the submedian without touching it, and within about 2 mm. of the outer margin. A small indistinct spot in 1*b* below the origin of vein 2. These spots are more or less outlined with black and ringed with dark red. Costa and outer margin with a narrow ochreous-yellow border. Outer margin with a pale border about 2 mm. wide.

Hindwing with two basal spots, two discal ones, and a post-discal row, differing somewhat in this respect from the pattern of *neavei* and more resembling *brahami*. A rounded spot at the base of cellule 7, extending into 8; a smaller spot, with heavy black ring, in middle of cell; a large oblong spot across end of cell, with its greater part outside the cell; a smaller costal spot above the latter, somewhat pear-shaped, its apex almost touching the spot at end of cell. A post-discal series of eight irregular spots. The anterior one in 6 small and touching the costal spot; the second spot in 5 placed more distad, and smaller than the others; the third spot in 4 placed still further distad, and more oblong in shape; the fourth and fifth spots in 3 and 2 are connected to form a bar and placed more proximally than the two above it; a small sixth spot in 1*c*, placed against vein 2 and connected to the fifth spot; a larger and more triangular seventh spot in 1*c*, placed against vein 1*b*; the eighth spot ovate and placed at the end of vein 1*a*, touching also 1*b*. A small rounded spot on the inner margin, placed about midway between the last post-discal spot and the base. A similar spot is placed on the inner margin near the anal angle. The spots of the post-discal series are more heavily edged with black on their distal edges. A submarginal dark red band of nearly even width is placed parallel to the margin, and bears a black spot in 7, 6 and 1*c*; a similar band is found also in *neavei*. Costal, outer and inner margins edged narrowly with ochreous-yellow mixed with dark red, and on the outer margin with a fine black terminal line which is heavy at the anal angle. Tail ochreous-yellow at the base.

Frons, palpi and antennae as in *brahami* except that the palpi are white below instead of yellowish. Palpus with the third segment black. Frons red-brown, white at the sides. Antennae black, tipped with lemon-yellow as in *brahami*, *rex* and others.

Expanse, 32 mm.; length of forewing, 17 mm.

*Hab.*—South Sudan: Mongalla Station, June, 1930, 1 ♂ (*Capt. I. G. Owen*).

In naming this insect we are glad to follow a suggestion made by Capt. Owen.

### 35. **Spindasis aderna pan** subsp. nov.

(Pl. II, Fig. 6.)

♂. Upperside with smaller blue areas than in either *aderna* Plötz or *spindasoides* Auriv. On the forewing the outer edge of the blue area is slightly incurved. On the hindwing the costal and outer borders are a little wider than in the allied forms. The brown anal area pale, with a linear extension along the outer margin. Underside more as in *spindasoides*, paler and less reddish.

♀. Resembles *spindasoides*, but is smaller. Forewing above with black discal spots. Two or three dots beyond the end of the cell forming a line, a dot in base of cellule 3, and below this a spot in 2 and another in 1*b*. Hindwing with the small discal spots more strongly marked than in *spindasoides*.

Underside as in the allied form, somewhat darker in colour.

*Hab.*—Uganda: About 2 miles N.N.E. of Entebbe, circa 3,800 ft., forest north-east of Kitabi Hill, 4.v.1912, 5 ♂♂, 2 ♀♀ (*C. A. Wiggins*) (♂ type); Victoria Nyanza, north-east shore, 3,800 ft., south Kavirondo, Ugaia, 1-31.i.1930, 5 ♂♂, 1 ♀ (*C. A. Wiggins*) (♀ allotype); west of Lake Victoria, Katera, Nov., 1933, 1 ♂ (*T. H. E. Jackson*). Also in the B.M. from the districts of Toro, Kavirondo, and Ruwenzori, 3,700—8,500 ft., September, October, November, January, May, collected by S. A. Neave.

### 36. *Axiocerses harpax* f. **kadugli** f. nov.

(Pl. II, Fig. 9.)

This may turn out to be a race confined to the drier regions of the Sudan, French West Africa, and elsewhere.

♂. Upperside coloration paler and somewhat golden, this colour much extended on the forewing, leaving a small basal area, a costal border, and an outer border of ground-colour as in the female. Besides the usual three cell-spots and the spot in base of 2, there is a post-discal line of four spots in 2—5, placed near the outer edge of the golden area. Hindwing with slight basal black.

Underside pale, resembling some Aden specimens, but the submarginal line on both wings is thinly marked.

♀. Upperside very like some specimens of the typical form, but with small dark markings, and only slightly dusted with black at the base. Underside paler than is usual in typical specimens, but agrees with a female in the B.M. from S.W. Africa.

*Hab.*—Anglo-Egyptian Sudan: Kadugli, Nuba Hills between El Obeid and Lake No, 29.iii.1904 (♂ type); id., 1904, 1 ♂, 9 ♀♀ (♀ allotype, 16.xii). Collected by R. S. Wilson. Also in the B.M. (*Coll. Joicey*) from the Haute Volta.

### 37. **Leptomyrina lara sobrina** subsp. nov.

♂. Upperside without basal sheen and with fuscous-brown coloration. Forewing with grey proximal dusting and an indistinct grey post-discal spot near each of the round submarginal ones. Hindwing with a post-discal row of very distinct grey-white dots in cellules 2—6, and no similar spot in 1*c* as in the typical form.

Underside scarcely differs from the typical form, except that the submarginal area of hindwing is more heavily shaded.

*Hab.*—KENYA: Salgalla, ca. 3,500 ft., about 100 miles north-west of Mombasa, 20.iv.1914, 20 ♂♂ (*K. St. A. Rogers*) (♂ type); Dabida, ca. 100 miles west of Mombasa, 1908, 1 ♀ (♀ allotype). PORTUGUESE E. AFRICA: Ankwabe, 25.vii.1918, 1 ♀ (*G. D. H. Carpenter*). SOMALILAND: Golis Mts., December, 1905, to January, 1906, 1 ♀ (*H. A. Byatt*). N.E. RHODESIA: Loangwa Valley, Petauke, 1905, 13 ♂♂, 2 ♀♀. Also in B.M. from Kenya: Hill near Maungu, January, 1916, 1 ♂ (*F. C. Selous*).

### 38. **Leptomyrina lara cana** subsp. nov.

♂. Resembles *sobrina*. Upperside with proximal area of both wings dusted with grey. Hindwing with larger grey post-discal spots from 1*b*—6 as in typical form. Underside as in *sobrina*.

*Hab.*—UGANDA: Lake Victoria Nyanza, north-east shore, 3,770 feet, Kisumu, plain and woodland, 26.xi.1902 to 14.i.1903, 7 ♂♂ (*C. A. Wiggins*) (type, 26.xi.1902). KENYA: Njoro, 29.viii.1929, 1 ♂ (*F. A. Dixey*); about 50 miles east of Machakos, 5,800 ft., 1908, 1 ♂ (*K. St. A. Rogers*); Nakuru, Rift Valley, ca. 6,400 ft., 16.viii.1919, 1 ♂ (*K. St. A. Rogers*).

### 39. **Lycaenesthes (Cupidesthes) wilsoni** sp. nov.

(Pl. II, Fig. 10; and Pl. III, Fig. 13.)

This species is known only in the female, and was first taken in 1917 by Mr. R. S. Wilson, to whom we have pleasure in dedicating it. Mr. Wilson presented to tho Hope Department a very fine collection of Lepidoptera from the Sudan. In 1925, Mr. (now Sir) Arnold Hodson sent a more perfect example of the species from S.W. Abyssinia.

This insect appears to belong to the subgenus *Cupidesthes* by its general appearance and by the broader and more conical form of the third segment of the palpus. It is a large species with an expanse of 37-41 mm., the fore-wing with a length of 19-21 mm.

♀. Upperside with fuscous-brown ground-colour. Forewing with basal area sky-blue, in one specimen extending into base of cellule 2. Post-cellular area in bases of 1*c*, 2—4, more thinly scaled, emphasising a discocellular spot and showing a whitish area in one specimen. Hindwing for the greater part blue, including the base of cellule 7, the cell, cellules 1*c*—4, and slightly in 5, reaching the submarginal line. The bluish-white submarginal line forms the edging to a row of three blackish marginal spots in 1*c* and 2, with indications of spots of darker ground-colour in 3—5; two rather small spots in 1*c*, and a much larger one in 2. The Sudan specimen of June 14th shows conspicuous bluish-white distal scaling. Fringe of forewing grey-brown, paler at tornus and inner margin, of the hindwing grey-white, the tufts at 2 and 3 brown.

Underside grey-white with sharply defined fuscous markings. Forewing basal area pale grey, extending to point of origin of vein 2, and not quite reaching end of cell; in one specimen this basal colouring is absent. An oblong discocellular spot. A post-discal row of six spots, as in other species, with traces of elongate spots in 7—9. The five somewhat quadrate spots in 2—6 are parallel to the margin, the two in 5 and 6 are distally convex, forming a curve, the other spots distally incurved, proximally convex. The spot in 2 is larger than the others, the one in 1*b*—*c* is either as large as the one in 2 or is narrower than the others, its more proximal position being such that its distal edge is in line with the proximal edge of the spot in 2. A heavy fuscous submarginal line formed of conjoined, slightly lunulate marks from cellule 6 to 1*a*, where it curves round the tornus as far as the lower post-discal spot. A narrower and paler antemarginal line which is sometimes separated into spots. A fine blackish terminal line.

Hindwing coloration as the forewing. Four sub-basal spots: a rounded fuscous spot in 7, a similar but smaller spot in the cell, an elongate spot below the cell in 1*c*, and one about the same size in 1*b*. An oblong discocellular spot which, in the type, has a small round spot touching it in the end of the cell; in another specimen the DC spot has a proximal projection, and in the third specimen the end cell-spot is absent. The discal spot in 7 is large and quadrate, and is placed proximally to the post-discal band so that its distal edge is in line with the proximal edge of the spot in 6. Post-discal spots in 1*b*—6: those in 4—6 larger and placed one below the other, their proximal edges slightly convex, their distal edges incurved; the posterior spots transverse, with their inner line nearly at right-angles to the anterior half of the band; spot in 3 smaller than the others, those in 1*b* and *c* elongate and joined at their distal ends. A heavy submarginal line as on the forewing, but more dentate; a pale antemarginal line. In cellule 2 a submarginal spot, black with broad yellow proximal edging and pale blue scaling between the yellow and the submarginal lunule, also blue scaling on the black distal edge. A similar spot, but smaller and quadrate, in 1*c* near the submedian; a still smaller one next it, and a similarly small one in 1*b* at the anal angle; altogether there are four marginal black spots with conspicuous orange-yellow proximal edging. A fine blackish terminal line.

*Hab.*—SOUTH-WEST ABYSSINIA: Kuron River, 3,300 ft. 28.iv. 1925 (*A. Hodson*), 1 ♀ (type). SUDAN: Nuba Mtns. Province, Talodi district, 4 miles east of Talodi, Hagar-el-Nar, 14.vi.1918 (*R. S. Wilson*), 1 ♀; Talodi district, Lambai, 34 miles north of Talodi, 10.viii.1917, 1 ♀.

Mr. Wilson notes that the specimen of June 14th was taken at flowers of the tree *Stereospermum kunthianum* ('Khoeh Khoeh Tree'). The other Sudan specimen was taken on a tree locally called 'Sahab.' The insect is said to fly high.

### 40. **Lycaenesthes saddacus** sp. nov.

(Pl. II, Fig. 8.)

In the key given by Aurivillius in Seitz xiii, p. 437, this species comes into the third group with *chirinda*, but is different to any of the eight species in the group. Upperside with a marginal border as in *afra* and *alberta*, but faintly indicated. Underside with the general appearance of uniformly-coloured specimens of *indefinita* B.-Bkr., but without basal spots in cell of hind-wing.

♂. Upper side blue as in *lunulata* Trim., and with similar dark marginal borders; the blue is, however, strongly copper-tinged, especially in the distal areas. On the hindwing the non-blue anal area between 1*b* and 3 is dark reddish-brown, and bears a black marginal spot in 1*c* and 2. Fringes grey-white, fuscous at the base.

Underside uniformly pale earth-brown with the markings outlined by white and a little darker in colour. Forewing without proximal spots. Discocellular spot large and oblong. Post-discal band of even width, parallel to outer margin, and therefore straighter than in most species; it consists of six conjoined rounded spots, the anterior three broader than the others. The inner edge of this band is more regular than the outer edge. The spot below vein 2 is placed a little proximally to the band, and is anteriorly narrowed. A narrow submarginal band as in *indefinita*, composed of somewhat lunulate and unconnected spots.

Hindwing with a sub-basal costal spot, rounded, and no more prominent than the similar but larger costal spot. A discocellular spot as on the forewing. No spot visible in the cell, but the specimens are slightly rubbed at the base. A curved post-discal band of nearly even width, formed of eight conjoined rounded spots, those in 2 and 3 distinctly smaller than the others. A narrow submarginal band as on the forewing, with strong proximal grey-white edging. A black marginal lunulate spot in 2, bearing some green scales and edged proximally with dull orange; a similar but smaller spot in 1*c*.

Antennal club orange below. Palpi with the third segment white below to just beyond the middle.

Expanse, 27 mm; length of forewing, 14·5 mm.

*Hab.*—Abyssinia: Lake Saddaca, 8.viii.1908 (*R. E. Drake-Brockman*), 1 ♂ in B.M. (type). Also a ♂ in poor condition in the Hope Department from S.W. Abyssinia: Tamanjayage, Shoa Gimira Prov., 29.i.1925 (*Arnold Hodson*).

### 41. **Lycaenesthes ochreofascia** sp. nov.

(Pl. II, Fig. 11; Pl. III, Fig. 12.)

This species appears to come nearest to *hobleyi* Neave. It is primarily distinguished by the absence of a spot in the cell of the hind-wing. The female is remarkable for the broad ochreous-yellow area on the hind-wing.

♂. Upperside deep violet-blue as in *hobleyi*. The costal and outer margin of forewing, and outer margin of hindwing, edged by a thin black line which is heavier along the costa. Costal area of hind-wing to vein 7 blackish-brown. Inner area of hindwing to middle of 1*c* fuscous. Hindwing in 1*c* and 2, at the margin, with an indistinct black squarish spot. Fringes of both wings smoky-grey, darker at the base.

Underside of the same dark brown ground-colour as in *hobleyi*. Forewing markings less distinct and less reddish than in *hobleyi*. The large dark spot across the end of the cell is indistinct and is partly divided by the cross-veins. A post-discal band of seven spots outlined with blackish and edged with grey on the outside. The anterior four spots of the post-discal band lie almost at right angles to the costa. The spots in 2 and 3 are more proximal, larger and square-shaped; the lower spot is still more proximal, narrow and curved, its outer edge in line with the inner edge of the spot above it. This post-discal band is similar in shape to the one in *hobleyi*, but is placed a little farther from the cell. A blackish submarginal line, heavy, though indistinct and undulate, placed about midway between the margin and the post-discal band. This line is most distinct from the submedian to vein 3, and within this area it is bordered outwardly by ochreous-yellow. There is no trace of a yellow marginal line as in *hobleyi*. Hindwing markings orange, the basal and discal spots in 7 more reddish. All spots are narrowly outlined with grey. The basal spot in 7 is ovate. The spot on the inner margin is smaller and rounded. Discocellular spot oblong and divided by the cross-veins. No spot in the cell. The post-discal band somewhat as in *hobleyi*, but its anterior half more strongly curved and placed farther from the cell. The band curves inwards below vein 4; the spot in 3 is smaller than the others, the spot in *1c* larger than the others, and the posterior spot in *1b* forms a narrow bar. A heavy undulate submarginal line which is indistinct above vein 5; this line expands at the margin in the lower part of 1c, and also in 2, where it fills up the insterspace; these marginal expansions bear a rounded black spot, much larger in *1c*, on which are placed a few metallic greenish-blue scales.

Antennae, head, and palpi as in *hobleyi*, but the palpi with bluish-white scaling below.

Expanse, 22 mm.; length of forewing, 12 mm.

♀. Upperside fuscous-brown with a darker thin marginal line and small discocellular spot. Hindwing with the distal area ochreous-yellow, extending to near end of cell and from *1b*—7, narrowing above vein 6 and below vein 2. In cellule 2 a rounded black marginal spot, with two smaller ones in *1c*, and a vestigial one in 3. A thin white marginal line between veins *1b* and 3.

Underside ground-colour paler than in ♂. Fore-wing markings larger and more distinct. Hindwing markings as in the ♂, but paler orange.

Expanse, 25 mm.; length of forewing, 14 mm.

Genitalia. No detailed description can be given as the specimen is mounted. It resembles *hobleyi* in some ways, the falces and shape of clasper being similar. The clasper is similarly cleft at the apex, the lower lobe being short and finger-like. It is not clear whether this species possesses the square process near the apex characteristic of *hobleyi*, but the specimen seems to show a thickened ridge in that area.

*Hab.*—UGANDA: L. Victoria, Sese Islands, Lutoboka, Bugalla Isle, ♂ bred from larva collected at the forest edge. Pupated 7.i.1913, emerged 17.i.1913, 1 ♂, 1 ♀. ♀ captured 13.xii.1912, both by G. D. H. Carpenter.

The following account of the larva was written by the captor:

Has the characteristic shape of a Lycaenid larva. Colour very difficult to describe—it is as if a bottom layer of green were thinly covered with dull madder. Each segment raised up mid-dorsally into a pyramid, the tip of which has few short hairs, its posterior surface being blackish. The whole larva is very finely pubescent. It is attended by ants.

Pupa not very obese, not pubescent. Leaf-green, with a faint, very narrow, brownish dorsal thoracic line which ends posteriorly in a light brown oval patch on dorsum of the abdomen.

*Food plant.* — Blossoms of *Bridelia micrantha* Baill. (Euphorbiaceae).

*Locality.*—Bugalla Island, L. Victoria.

### 42. **Lycaenesthes hodsoni** sp. nov.

(Pl. II, Fig. 12; Pl. III, Fig. 14.)

This species belongs to the section without basal spots on the fore-wing below, and appears to come near *otacilia* Trim. It is a much larger species with an expanse of 32 mm., the fore-wing measuring 17 mm. in the type. The upperside appearance is very different to any other, with its pale brown colour and whitish area on the fore-wing.

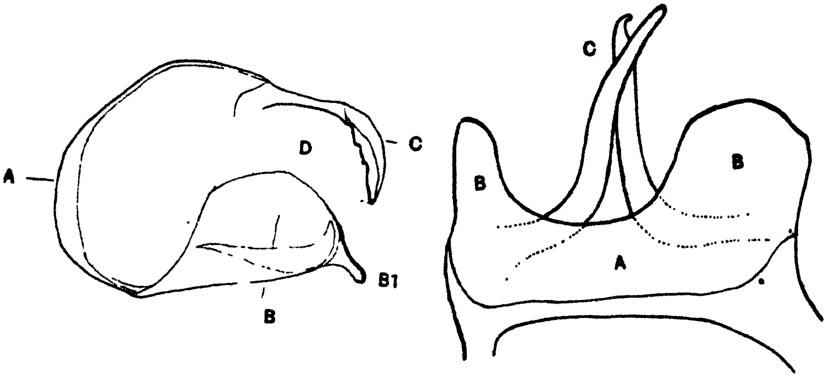
♂. Upperside ground colour pale cupreous-brown. Forewing with a whitish discal area from vein 6 to the inner margin, leaving the base to end of cell, the costa, apex and outer margin broadly of the ground colour. The upper discocellular is defined by the ground colour, forming a distinct mark. The pale area is suffused with violet-blue, stronger below the cell. Hindwing dark blue in the cell for the greater part, some blue scaling in the base of cellule 7, and violet-blue scaling below the cell in 1*c*, 2, and 3. An obscure post-discal series of whitish lunulate marks as in the females of some other species. The blue colour does not extend beyond this line. A marginal series of blackish-brown spots; the spot in 2 is larger and much darker, and is proximally narrowed. All these spots are proximally edged with white, forming a submarginal line interrupted by the veins. A fine white marginal line. Both wings with a fine blackish-brown outer marginal line. Fringes fuscous, grey-white at the base.

Underside of forewing with basal half pale brown to end of cell, distal half grey-white. Basal area without markings. Discocellular spot as in *otacilia*, quadrate with white edging. A post-discal series of seven spots arranged as in *otacilia* in 1*b* and *c*, 2, 3, 4, 5, 6, 8. The anterior spot is linear, the ones in 2-6 of nearly equal size, somewhat square and rounded on their proximal and distal edges, the two in 4 and 5 placed more distad than the others, the posterior spot oval and double and placed more proximad than the others. These spots are white, outlined by fuscous-brown, and in three specimens are much less clearly defined. A submarginal fuscous line, interrupted by the veins, and accentuated posteriorly. An antemarginal fuscous line, a fine white marginal line of the ground colour, edge of wing finely blackish-brown as on upperside.

Hindwing ground colour as in paler examples of *otacilia*, pale fuscous-brown on a grey-white ground. The sub-basal and discal spots in 7 are rounded, jet black, and edged with white, the discal spot the larger. A spot similar to the basal spot lies in the middle of cell, and there is another more ovate and smaller spot below cell in 1*c*. A similar rounded sub-basal marginal spot in 1*a*. Discocellular spot large, longer than on the forewing. Post-discal series arranged as in *otacilia* and consisting of seven connected spots, those in 4 and 5 more distad than the others. The first of these in 6 is round, sometimes entirely white-edged, and placed distad of the black spot in 7; those in 1*b* and *c* together form a bar which is proximally incurved. A submarginal grey-white dentate line forms the edging to a series of small triangular brown spots; a similar row of antemarginal white-edged spots, more linear in shape; the spot in 2 large and square, rounded proximally, jet black with slight yellow proximal edging; a similar and smaller spot in 1*c* near the submedian, as in *otacilia*. A thin white marginal line edged on the outside by a fine fuscous line as on the upperside.

Eyes pubescent. Frons black, white at the sides, and with a grey mesial area as in *otacilia*. Palpi with first and second segments white below and at sides, fuscous above, third segment fuscous. Antennae as in *otacilia*.

Genitalia (figs. 1, 2). These organs bear some resemblance to *otacilia* (Bethune-Baker, Trans. Ent. Soc. 1910, pl. VI, fig. 14). The valve (fig. 1) is more square. It is deeply excised on the ventral side, forming two lobes. The proximal lobe is produced at its lower edge to a strongly sclerotized finger-like process. The distal lobe is strongly sclerotized on its ventral edge, where it is slightly cleft, the inner edge here armed with three or four teeth. The falces (fig. 2) are long and narrow, strongly curved near the base, and taper gradually to a very short and narrow curved tip. The penis sheath is quite similar in shape to that of *otacilia*.



GENITALIA OF *Lycaenesthes hodsoni*.

FIG. 1.—Valve, ventro-lateral view. A, dorsal edge; B, proximal lobe; B1, proximal process; C, distal lobe; D, inner side of distal area.

FIG. 2.—Tegumen, dorsal view. A, tegumen; B, lobes of tegumen; C, falces.

*Hab.* — SOUTH-WEST ABYSSINIA: 6° 1′ N., 35° 28′ E., Kibish River, 2,800 ft., 28.ix.1925 (*Arnold Hodson*), type and three paratypes in the Hope Department.

We have pleasure in dedicating this species to Sir Arnold Hodson, who very generously presented his fine Abyssinian collection to the Hope Department.

### 43. **Triclema lucretilis albipicta** subsp. nov.

♂. Distinguished from *lucretilis* Hew. from the Gaboon and W. Africa by a short white apical costal bar on the hindwing, composed of two spots in 6 and 7. On the hindwing below the costal spot is larger, and the discocellular bar on both wings is smaller.

This form occurs in the Cameroons also, but most of those specimens show a narrower white bar on the hind-wing above.

*Hab.*—CONGO: Upper Congo, Basankusu, Bongandanga, 10.vi.1932, 1 ♂ (*Miss G. Vinall*).

(*To be continued.*)

## *SMICRONYX REICHI* GYLL., WITH NOTES ON OTHER SPECIES OF THE GENUS (COL.).

BY K. G. BLAIR, D.SC., F.R.E.S.

From a handful of seedheads of the Red Centaury, *Erythraea Centaurium* Pers., gathered at Eynsford on August 11th last, some very small yellowish weevil larvae emerged a few days later. These were placed in a glass tube of damp sand, into which they soon disappeared. Expecting some *Apion,* though none is recorded from this host-plant, on September 25th I was surprised to find a specimen of *Smicronyx reichi* in the tube, and within the next few days two more of the beetles emerged.

This little beetle has long been something of a puzzle to Coleopterists. The other British species of the genus occur on Dodder, *Cuscuta epithymum* Murray, and when found are usually present in some numbers, but our records of *S. reichi* are all of single specimens taken by general sweeping in chalky districts.

The species was introduced to the British list by E. C. Rye (1872), on two examples taken, one by Mr. G. C. Champion between Folkestone and Dover, the other by Mr. E. A. Waterhouse, also at Folkestone. James Edwards, in his useful discussion of the genus (1910), refers to another taken by Mr. Champion at Caterham and to two more in F. Smith's collection without data.

Fowler (1890 and 1891), apparently through a misunderstanding of the species, renamed it var. *championis,* under which name it was recorded by Jeffery (1921) from the Isle of Wight, and a specimen from Culver Cliffs, I.O.W., was recently shown me by Col. West. Examples from Box Hill, Arundel, and Birch Wood, localities mentioned by Fowler, are in the Power Collection. It is uncertain whether Commander Walker's record from Chatham (Fowler, Suppl.) refers to this species,* but Donisthorpe (1925) reintroduces it as *S. seriepilosus* Tourn. on a single specimen from Mickleham. This determination, Mr. Donisthorpe tells me, was made from Reitter, Fauna Germanica, but the *S. reichi* of this work obviously refers to abraded examples. Mr. Donisthorpe's record from Totnes (Edmonds) must be deleted. Mr. Edmonds has kindly allowed me to see his specimens, which are *jungermanniae* Reich as generally understood. These isolated occurrences, and the complete failure to find the species on Dodder, would seem to be fully explained by the connection of the beetle with *Erythraea,* a plant of the chalk downs. This association of the beetle with its food-plant is not altogether new, for Deville (1924) states that it has several times been taken by M. Portevin on the flower-heads of this plant, though Hustache (1930) regards the association as accidental.

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* I have three specimens in good condition of *S. reichi*, all taken by sweeping on open chalk downs, viz., Holly Hill, Kent, May 9th, 1896; Cuxton, Kent, June 11th, 1898; and near Blewbury, Berks, May 30th, 1918 —J J.W.

Though we have but three, or possibly four, species of the genus in Britain, probably no genus presents greater difficulty in disentangling the synonymy; indeed, until the types of some of the older species can be examined, their identity must remain more or less uncertain. *Pissodes pygmaeus* Curt. (1840) was considered by Fowler to include both *S. reichi* and *jungermanniae,* but Edwards argues that the description applies only to the species with unequal claws, i.e. *coecus* Reich of most authors (*politus* Boh.). By the kindness of the authorities of the National Museum, Melbourne, I have been able to examine the type of *pygmaeus* and find that this identification is correct. With the type were two other specimens with a printed label '*jungermanniae.*' These are no doubt the three specimens referred to by Curtis in the note following the description of *Pissodes* (?) *pygmaeus* : ' I have completely forgotten where I found the three specimens that are in my cabinet.' It would thus appear that he subsequently recognised either that his three specimens represented two species, identifying one of them with *S. jungermanniae* Reich, or that his name was a synonym of this. This determination of *jungermanniae,* however, does not accord with that now current, the specimens being the *S. reichi* of this note and are thus the earliest known British examples of this species.

Nor is the confusion limited to the application of the names but extends even to the names themselves. Thus G. C. Reich, the author of two of our specific names, has been confused with the later but more widely known Louis Reiche, and the species named after Reich is frequently spelt ' Reichei ' (Fowler, 1891, nec 1913). Again *cicus* Gyll. appears in Gemminger and Harold's Catalogue (1871) as *cicur,* a spelling that has been followed by many subsequent authors. There is a Latin adjective *cicur* (*cicuris*) meaning 'tame, domesticated,' whereas I find no word *cicus* in the dictionary, and it seems probable that *cicur* was a deliberate emendation on the part of Gemminger and Harold of a supposed misprint; but that *cicus* was no misprint is proved by the use by Gyllenhal himself of the word *cico* in comparing the species immediately following.

With regard to the separation of our species Edwards' paper is perfectly explicit:

*S. coecus* Reich (*pygmaeus* Curt.) is readily distinguished by the markedly unequal tarsal claws. The upper side has few oval scales very easily abraded and usually absent almost altogether; the sternum and abdomen, however, frequently exhibit a dense clothing of white scales. Walker (Ent. Mo. Mag., XXX, p. 210, 1894) has taken it freely on the Chesil Beach, whence come the series in the Power Collection, and it has occurred to me rarely in company with *jungermanniae* on Dodder on gorse on Saunton Down, North Devon.

*S. reichi* Gyll. (*championis* Fowl. *seriepilosus* Donis.) has the same broad form as *coecus*, the elytra being only about one and a half times as long as broad, but has the tarsal claws equal. In good condition it has a clothing of large broad scales which form irregular white patches on a brown background, but is frequently abraded. It occurs on chalk downs, and is associated with *Erythraea* and not with Dodder. The record from *Cuscuta* on Chesil Beach (Dale, in Pearce's list of the Coleoptera of Dorset) is no doubt *S. coecus* of Walker in the same list. Walker does not refer to the genus in his notes on the Coleoptera of the Dale Collection (E.M.M., 1932).

*S. jungermanniae* is distinguished by Edwards from *coecus* by its equal claws and from *reichi* by its more elongate form, the elytra being twice as long as their basal width, and by the smooth thorax, the latter in *reichi* being rough and scabrous. The elongate form will also distinguish it from *coecus*. It appears to vary considerably in size as well as in the closeness of the thoracic punctures and the shininess of their interspaces, also in the shape of the elytral scales; and it is possible that we may have more than one species confused under this name. Hustache mentions a var. *funebris* Tourn., which has the punctures of the thorax closer and more rugose, that may apply to one of our forms.

This is the commonest of the genus with us. I have taken it in some numbers from Dodder on *Erica* and *Calluna* at Oxshott and from Dodder on gorse at Saunton Down. Donisthorpe has it from

Chobham and Greenham and Jeffery from the Isle of Wight.

The life-history of *S. jungermanniae* has been described by Urban (1914), the larva living in a gall on the stem of the Dodder.

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British Museum (Natural History),
London, S.W.7.
*April 11th*, 1935.

## COLEOPTERA NEW TO IRELAND FROM CO. KERRY.

By EDWIN BULLOCK.

The species of Coleoptera in the following list have apparently not as yet been recorded from Ireland. They are mostly from the Killarney area, my garden having yielded some very interesting forms. I have given full particulars as to locality respecting those taken otherwise than in the Killarney district. I am most grateful to the following gentlemen—Messrs. K. G. Blair, J. H. Keys, H. Donisthorpe, J. J. Walker and H. Britten—for valuable assistance in naming the more obscure species for me.

*Pterostichus cupreus* L. ab. *affinis* Sturm. Ballycicshane.
*Cercyon subsulcatus* Rey. In lake shore refuse.
*Oxypoda procerula* Mann. In flood refuse, Castlemaine.
*Atheta subtilissima* Kr. Amongst shingle, Flesk river.
,, *cambricina* Keys. Amongst dead leaves, lake shore.
,, *obtusangula* Joy. Lake side.
,, *angustula* Gyll. At roots of grass, Ballycicshane.
*Homalota plana* Gyll. Under bark, Deer Park, one specimen only.
*Gyrophaena poweri* Crotch. In fungi, at Ross Castle Lake side.
*Heterothops praevia* Er. In garden refuse.

*Staphylinus siculus* Stierl. Running on road, rare in this district; *globulifer* Ris, common in the whole county.
*Philonthus albipes* Grav. ab. *alpinus* Epp. In cut-grass, park.
*Gabrius velox* Sharp. In stercore.
*Cryptobium fracticorne* Payk. In *Sphagnum*, Guittane Bog, rare.
*Scopaeus sulcicollis* Steph. I found one specimen of this rare species in my garden.
*Bledius fracticornis* Payk. var. *laetior* Muls. I found this species quite commonly crawling on the paths of my garden.
*Omalium caesum* Grav. ab. *subruficorne* Berg. From garden refuse.
*Proteinus macropterus* Gyll. In fungi in woods.
,, *limbatus* Mak. In fungi in woods.
*Bibloplectus pusillus* Denny. In lake side refuse, common.
*Trichopteryx thoracica* Waltl. In refuse.
,, *anthracina* Matt. In refuse.
,, *bovina* Mots. In garden refuse.
*Baeocrara variolosa* Matt. In my garden.
*Rhizobius litura* F. ab. *discimacula* Muls. By sweeping.
*Meligethes subrugosus* Gyll. By sweeping near Beaufort.
*Cryptophagus subfumatus* Gyll. In refuse.
,, *badius* Sturm. In refuse.
,, *hirtulus* Kr. In garden refuse.
*Agriotes pallidulus* Ill. By sweeping near, Ross Castle.
*Cis vestitus* Mell. In fungi in woods.
*Lochmaea crataegi* Fab. var. *flavus* Donis. By sweeping.
*Phyllobius maculicornis* Gmel. By sweeping.
*Sitona cambricus* Steph. By sweeping, rare.
*Limnobaris t-album* Linn. By sweeping, Ballycicshane.

High Street, Killarney.
*May 15th, 1935.*

## THE SPECIES OF *BEMBIDION* IN THE STEPHENS COLLECTION (COL.).

BY DR. FRITZ NETOLITSKY, VIENNA.

[NOTE. Translated from the German. With few exceptions, marked with an asterisk (*), Dr. Netolitsky's determinations of these old Stephensian specimens agree well with the synonymy of G. R. Waterhouse's 'Catalogue of British Coleoptera,' 1858, if due allowance be made for changes that have become accepted since that date; e.g. *Peryphus littorale* Ol. of the Catalogue is now known as *ustulatum* L., and *Notaphus ustulatus* L. of the Catalogue as *varium* Oliv. What few changes might be made, such as the removal of *albipes* Steph. from *decorum* Panz. to *stomoides* Dej. and *viridiaeneum* Steph. from *decorum* Panz. to *tibiale* Dufts., are of minor importance since the Stephensian name remains in synonymy.

Interpolations in square brackets [ ] are inserted by me. Certain species not now placed in *Bembidion* were not sent to Dr. Netolitsky but are here included in order to make more complete the revision of the genera as used by Stephens. Where two or more species are included under one name that of Waterhouse's synonymy, or its modern equivalent, is placed first. The order adopted is that of the 'Manual,' 1839, combining the two series of descriptions of Illustr. Brit. Ent. Mandib., Vol. II, 1828, and Vol. V (Appendix), 1835. The latter are marked (App.). K.G.B.]

By the kind co-operation of Mr. G. J. Arrow I have been enabled to revise the species of *Bembidion* of the Stephens Collection, now preserved in the British Museum (Natural History), and have been able to clear up certain points of synonymy previously dealt with by Schaum and Jacquelin du Val. In the course of my revision it became apparent that different species not seldom stood under the same name, with characters in part contradictory to the original description. It appears, therefore, that alterations, the number of which cannot now be ascertained, have been subsequently made in the collection. Consequently it is impossible to propose certain changes in name and is best to leave matters as they are and avoid all unnecessary alterations. One case only I might mention: Herr Csiki in his Catalogue has introduced the name *B. haemorrhoum* Steph. in place of *B. mannerheimi* C. Sahlb. (nec Dej.). The collection shows, however, that under this name stand only two examples of *B. guttula* F. and two of *B. obtusum* Serv. The name *haemorrhoum* Steph. cannot therefore be used for *B. mannerheimi* for which *B. unicolor* Chaud. will have to be used.

[In Waterhouse's Catalogue *haemorrhoum* Steph. is placed as a var. of *guttula* F.]

| STEPHENSIAN NAME. | NOW STANDING IN THE COLLECTION. |
|---|---|
| [*Tachys scutellaris* St. | 1 ex.: *Tachys scutellaris* St.] |
| ,, *binotatus* St. | 6 ex.: all *B. guttula* F. (1792). |
| ,, *vittatus* St. | 5 ex.: 3 *B. guttula* F., 2 *B. lunulatum* Fourc. (1785). |
| ,, *immunis* Kirby | 5 ex.: 4 *B. obtusum* Serv. (1821), 1 *B. guttula* F. |
| ,, *obtusus* Sturm (?) | 5 ex.: 4 not quite mature *B. obtusum* Serv., 1 *B. Mannerheimi* C. Sahlb. |
| ,, *pusillus* De Jean | 5 ex.: all *B. obtusum* Serv. |

| STEPHENSIAN NAME. | NOW STANDING IN THE COLLECTION. |
|---|---|
| *Tachys gracilis* St. | 2 ex. : 1 *B. obtusum* Serv. ; the other is not a *Bembidion.* [*Acupalpus exiguus* Dej.] |
| ,, *minutissimus* Leach | 4 ex. : all *Tachys bistriatus* Dufts. (1812). |
| *Philochthus aeneus* Spence | 3 ex. : 1 *B. aeneum* Germ. (1824), 2 *B. lunulatum* Fourc. |
| ,, *fuscipes* De Jean | 6 ex. : all *B. biguttatum* F. (1779). |
| ,, *subfenestratus* Megerle | 4 ex. : 2 *B. biguttatum* F., 2, *B. lunulatum* Fourc. |
| ,, *biguttatus* Illiger | 5 ex. : 2 *B. biguttatum* F., 3 *B. lunulatum* Fourc. |
| ,, *guttula* Illiger | 6 ex. : 1 *B. guttula* F., 5 *B. lunulatum* Fourc. |
| ,, *haemorrhous* Kirby | 4 ex. : 2 *B. guttula* F. with elytral apices pale, 2 *B. obtusum* Serv. |
| *Ocys currens* Kirby (*cyaneus* in coll.). | 5 ex. : all *O. quinquestriatus* Dufts. |
| ,, *melanocephalus* Leach | 4 ex. : all *O. harpaloides* Serv. |
| ,, *tempestivus* Panz. | 2 ex. : *O. harpaloides* Serv. |
| *Peryphus femoratus* Sturm (App.). | 9 ex. : 8 *B. femoratum* Strm. (1825), 1 *B. rupestre* L. (*bruxellense* Wesm.). |
| * ,, *concinnus* Kirby (App.). | 10 ex. : 9 *B. femoratum* Sturm, 1 *B. ustulatum* L. (*litorale* Ol.) [retained as *concinnum* St. by Waterhouse and later authors]. |
| * ,, *maritimus* St. (App.). | 3 ex. : 2 *B. femoratum* Strm., 1 *B. concinnum* as usually understood (*dorsuarium* Bed.). |
| [ ,, *tetraspilotus* Rudd (App.). | No ex. : *B. ustulatum* L. (*littorale* Oliv. of G.R.W.).] |
| ,, *littoralis* Oliv. (App.). | 13 ex. : all *B. ustulatum* L. (Gglb.). |
| ,, *saxatilis* Gyllh. (App.). | 5 ex. : 4 *B. saxatile* Gyll., 1 *B. rupestre* L. (*bruxellense* Wes.). |
| ,, *elegans* St. (App.). | 1 ex. : *B. rupestre* L. (*bruxellense* Wesm.), hence not synonymous with *saxatile* Gyll. [G.R.W. placed it with *littorale* Ol. (*ustulatum* L.).] |
| ,, *lunatus* Dufts. | 4 ex. : all rather immature *B. lunatum* Dufts. |
| ,, *ustus* Schönh.? | 4 ex. : all mature *B. lunatum* Dufts. |
| ,, *decorus* Panz.? | 6 ex. : 1 each of *decorum* Zenker (Panz.), *B. monticola* Sturm and *atroviolaceum* Dufts. (*stomoides* Dej.), 3 *B. stephensi* Crotch. |
| ,, *rufipes* Ill. (*affinis* Steph.) (App.). | 2 ex. : both *B. stephensi* Crotch [*stephensi* Crotch = *affinis* Steph. of G.R.W.]. |
| ,, *nitidulus* Marsh. | 8 ex. : 6 *B. nitidulum* Marsh, 1 *B. tibiale* Dufts. and 1 *B. saxatile* Gyll. |
| * ,, *albipes* Sturm (App.). | 1 ex. : *B. atroviolaceum* Duv. (*stomoides* Dej.) [to *decorum* Panz. by G.R.W.]. |
| ,, *monticulus* Sturm (App.). | 2 ex. : *B. monticola* Sturm. |

| STEPHENSIAN NAME. | NOW STANDING IN THE COLLECTION. |
|---|---|
| **Peryphus viridiaeneus* St. | 5 ex.: 4 immature *B. tibiale* Dufts., 1 *B. stephensi* Crotch [*decorum* Panz. by G.R.W.]. |
| * ,, *agilis* Spence | 9 ex.: all *B. decorum* Zenker (Panz.) [*monticulum* Sturm by G.R.W.]. |
| ,, *cnemerythrus* St. (App.). (*tibialis* Steph., 1828, nec Dufts.). | 5 ex.: all not quite mature *B. tibiale* Dufts. |
| ,, *Leachii* Spence | 5 ex.: 3 *B. prasinum* Dufts., 2 *B. tibiale* Dufts. |
| ,, *olivaceus* Gyll. | 6 ex.: 2 *B. prasinum* Dufts., 3 *B. atrocoeruleum* Steph., 1 *B. tibiale* Dufts. |
| ,, *atrocoeruleus* Steph. | 5 ex.: 4 *B. atrocoeruleum* St., 1 *B. redtenbacheri* Dan. |
| ,, *tibialis* Dufts. (App.). | 7 ex.: all *B. tibiale* Dufts. |
| [ ,, *Fellmanni* Gyll. (App.). | No ex., nor in Cat. G.R.W.] |
| *Notaphus undulatus* Sturm | 12 ex.: 10 *B. dentellum* Thunb., 2 *B. saxatile* Gyll. |
| ,, *ustulatus* Illig. | 9 ex.: 8 *B. varium* Ol., 1 *B. dentellum* Thunb. |
| ,, *nebulosus* St. | 1 ex.: *B. varium* Ol., with extensive yellow markings (this pale colouring is extraordinary). |
| ,, *bifasciatus* Leach | 9 ex.: all *B. varium* Ol. |
| ,, *obliquus* Sturm | 4 ex.: all *B. varium* Ol. (one is slightly spotted with yellow, but not *B. obliquum* Sturm). |
| ,, *stictus* St. | 4 ex.: all *B. fumigatum* Dufts. (1812). |
| ,, *fumigatus* Creutzer | 4 ex.: all *semipunctatum* Donov. (*adustum* Schm.). |
| ,, *ephippium* Marsh. | 8 ex.: all *B. ephippium* Marsh. |
| ,, *castanopterus* St. | 1 ex.: immature *B. assimile* Gyll., with reddish-brown elytra. |
| *Lopha poecila* Hoffm. | 6 ex.: 5 *B. articulatum* Panz. (1796), 1 *B. ephippium* Marsh. |
| ,, *quadriguttata* F. | 7 ex.: all *B. genei* var. *illigeri* Netol. |
| ,, *quadrimaculata* L. | 7 ex.: all *B. quadrimaculatum* L. |
| ,, *pulchella* Marsh. | 1 ex.: a bluish *B. lampros* Herbst. |
| * ,, *assimilis* Gyll. | 4 ex.: all *B. normannum* Dej (1831). |
| ,, *pusilla* Gyll. (*Kirbyi* Steph. i.l.) | 2 ex.: both *B. normannum* Dej. |
| ,, *nigra* Wilkin | 2 ex.: both *B. gilvipes* Sturm. |
| ,, *pulicaria* Marsh. | 5 ex.: all *B. minimum* F. (1792). |
| ,, *minima* F. | 6 ex.: all *B. minimum* F. |
| [ ,, *nana* St. (App.). | No ex., nor in Cat. G.R.W.; *minimum* F. in Csiki's Cat.] |
| ,, *Doris* Illig. | 9 ex.: all *B. assimile* Gyll. |
| ,, *Spencii* Kirby | 4 ex.: 1 *B. assimile* Gyll., 3 *B. clarki* Dawson (1849). |
| ,, *haemorrhoidalis* St. (App.). | 4 ex.: 3 *B. normannum* Dej. (1831), 1 *B. doris* Panz. (1797). |

| STEPHENSIAN NAME. | NOW STANDING IN THE COLLECTION. |
|---|---|
| *Tachypus celer* F. | 5 ex. : all small *B. lampros* Herbst. |
| ,, *properans* Hoffm. | 5 ex. : all *B. lampros* var. *properans* Steph. |
| ,, *acutus* Marsh. | 4 ex. : 3 immature, pale and deformed *B. lampros* and *properans*, 1 immature *B. lunulatum* Fourc. |
| ,, *chalceus* St. | 3 ex. : all *B. lampros*, with bluish or greenish tints. |
| ,, *orichalcicus* Illig.? | 4 ex. : 3 *B. lampros*, 1 var. *properans*. The colour 'shining greenish brass' is no longer visible. |
| *bipunctatus* L. | 6 ex. all *B. bipunctatus* L. |
| *chlorophanus* Sturm | 8 ex. 7 *B. punctulatum* Drap., 1 *B. atrocoeruleum* Steph. |
| ,, *striatus* Dufts. | 6 ex. all *B. punctulatum* Drap. (one has an old label '*puncticolle*'). |
| ,, *andreae* F. | 5 ex. all *B. pallidipenne* Illig.. |
| *Bembidium paludosum* Panz. | 4 ex. all *B. litorale* Ol. (Ganglb.). |
| [ ,, *impressum* F. | 1 ex. *Asaphidion flavipes* L.] |
| [ ,, *flavipes* L. | 11 ex : all *Asaphidion flavipes* L.] |
| [ ,, *pallipes* Dufts. | 8 ex. all *Asaphidion pallipes* Dufts.] |

*February 13th, 1935.*

## WHAT IS *ACRYDIUM BIPUNCTATUM* L.?

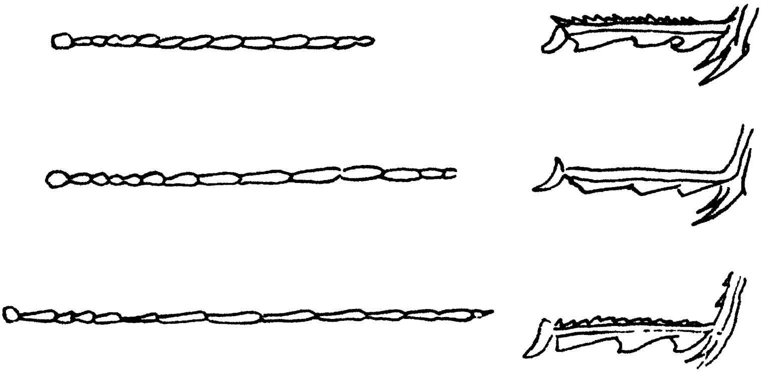
BY MALCOLM BURR, D.SC., F.R.E.S.

In a very suggestive paper on the significance of our British Orthoptera (Contr. a l'Étude du Peuplement des Iles britanniques. Soc. de Biogeogr., III, 1930), Uvarov states that all the British specimens of so-called *Acrydium bipunctatum* studied by him belonged to a different species, *A. kiefferi* (Saulcy), that *A. kraussi* (Saulcy) is known to him from a few specimens from Scotland in the Cambridge Museum, and that the presence of the true *A. bipunctatum* of Linnaeus in these islands has yet to be proved.

The division of our familiar species, so long called *Acrydium*, or *Tettix, bipunctatum* L. into two if not three distinct forms was recognised more than forty years ago by Krauss and de Saulcy, but for some reason the work of the latter was strangely neglected by Orthopterists, myself included, for many years.

In the Ent. Tidskr., 1909, p. 18, Bernard Haij gave an excellent little monograph of the five species of the genus included in the Swedish fauna; he lays stress on the smallest characters, actually defining in some cases as many as five subspecies. The paper must be studied by all who are interested in the genus; unfortunately, it is in Swedish, but the illustrations are clear.

Haij points out that the chief distinctions are in the relative length of the middle segments of the antennae, a character which is correlated with the structure of the pads under the tarsi and other subtle features which appear to be undoubtedly constant. He points out also that the form that Linnaeus had before him was most probably the most northerly of the three, that is *kraussi* Saulcy, with the shortest antennal segments, but does not alter the name. His conclusions are to be accepted, but not his synonymy, which has been established by another Swedish writer, Professor Ander, in Ent. Tidskr., 1931, p. 245.



*A. bipunctatum* L.
*A. kiefferi* (S.).
*A. tenuicorne* Sahlb.
Antennae.

*A. kiefferi* (S.).
*A. bipunctatum* L.
*A. tenuicorne* Sahlb.
Third segment of posterior tarsi.

(Greatly magnified.)

The combined results are as follows:—

*A. bipunctatum* of Linnaeus is the most northerly in range; it is the one with the shortest segments; Haij recognises five forms or subspecies. It is this species which is generally called *kraussi* (Saulcy), and has been recognised in Scotland by Uvarov.

*A. kiefferi* (Saulcy), with distinctly longer antennal segments, is more southerly in range; it has a wide distribution in Europe, and seems to be our common English species.

*A. tenuicorne* (Sahlberg) is a third, with slender antennal segments, which was called *bipunctatum* by Saulcy and Haij. It is quite distinct but more eastern in range, occurring in Finland, and the island of Gotland, but not in Sweden. It seems hardly likely that it occurs in England.

It is very desirable that collectors in the field in the north, especially on mountains and hill-tops, and in Scotland, bear these points in mind, and help define the areas of our two recognised British species.

They are interesting creatures, of a different habit from the other grasshoppers in that they are mature in May, dying away in the summer; as from about July only immature specimens are found, which grow to hibernate in the adult stage.

In the paper quoted above, Uvarov treats all the genus as hygrophilous; this is certainly true of *A. subulatum*, but *A. kiefferi* is to be found in the dryest places.

11 Ray Drive Mansions, Maidenhead.
*March 20th, 1935.*

## ON THE LABIUM OF *LOCUSTA MIGRATORIA* L.

BY KHAN A. RAHMAN, B.SC. (EDIN.)
(Entomological Department, Zoological Laboratory, Cambridge).

It is desirable to call attention to the figure given by Uvarov (1928; p. 4, fig. 2 La) of the labium of *Locusta migratoria* (*migratorioides*). The figure in question is after one given by Chang in a work written in Chinese. The figure is misleading in several respects, particularly as regards the *labial suture*, the form of the *paraglossae*, and the absence of *glossae*. If an adult, either male or female, of *Locusta migratoria* (*migratorioides*) be examined the labium will be found to present the following characters * :—

The *postmentum* consists of a single more or less semilunar sclerotized *submentum* with the *labial suture* distinct laterally but obsolete mesially. The *prementum* is trapezoidal, for the most part sclerotized and medially cleft distally, the cleft is continued posteriorly as a median groove up to about the middle. This groove marks the position of the *labial apodeme* (Walker (1933)). The *palpigers* are ventral and each is marked off from the *prementum* by a distinct suture. Located behind the base of each *palpiger* are a number of minute setae, the tubercles of which, in a potash-cleared specimen, appears as white dots. These setae are most probably sensory in function. The *labial palpi* with segments related in length as 1 : 1·6 : 2, the apex of third labial segment is densely clothed with fine setae which possibly act as sensillae. The left *glossa* is vestigial and only visible from the dorsal aspect. The right *glossa* although small is clearly evident and separated from the *prementum* by an oblique suture, prominent ventrally. The *paraglossae* are greatly expanded, and separated from the *prementum* by prominent sutures that appear internally as well-developed ridges. The left *paraglossa* is slightly the larger and has a distinct concavity along its inner margin in which fits the inner margin of the smaller right *paraglossa*. The apices of both *paraglossae* are incurved, that of the right *paraglossa* being pointed and that of the left rounded. These features are shown in the accompanying illustrations.

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* For terms employed see Imms (1934) page 21.

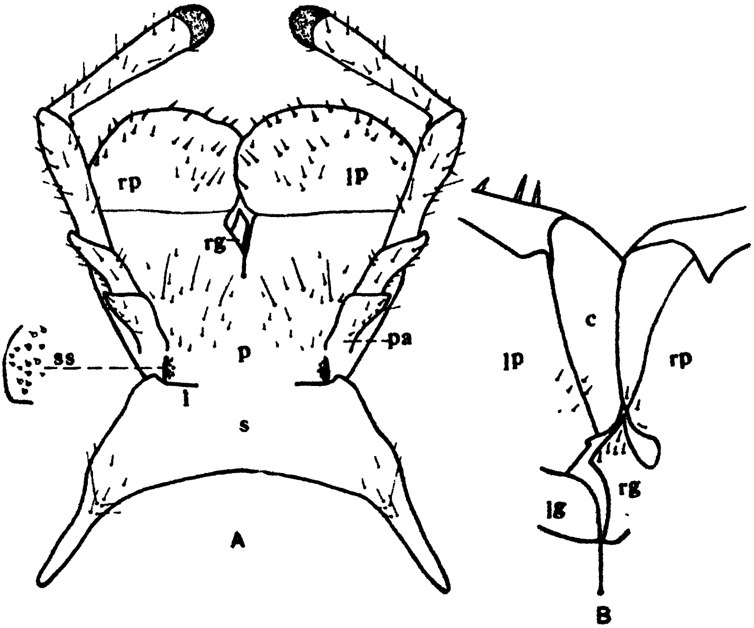

FIG. 1.—(A) Labium of *Locusta migratoria* L., ventral aspect, × 16. (B) Middle portion of ligula of *L. migratoria* L., dorsal aspect, × 36. *Abbreviations* : c.—concavity along the inner margin of left paraglossa ; l.—labial suture ; lg.—left glossa ; lp.—left paraglossa ; p.—prementum ; pa.—palpiger ; rg.—right glossa ; rp.—right paraglossa ; s.—submentum ; ss.—sensory setae (?).

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University of Cambridge,
Department of Zoology.
*March 27th*, 1935.

*Aculeate Hymenoptera from Northants and Wood Walton Fen, Hunts.*— Through the kindness of Miss Miriam Rothschild, I have been afforded the opportunity of sorting a collection of Aculeates procured by the late Hon. N. C. Rothschild mainly from the district of Oundle and Wood Walton Fen, between the years 1921 and 1923. With unimportant exceptions, the localities fall within a limited area which includes the N.E. end of Northamptonshire and the north of Huntingdonshire. The district being agricultural and woodland with a deficiency of light soils, many of the fossorial species, in particular, are excluded through lack of suitable habitats; and in the circumstances the occurrence of 129 bees and wasps, not including Bombidae, Vespidae, or Chrysididae, is more than might have been expected. Forms which nest in dead wood and hollow stems are well represented.

Among the species included are several which are scarce or apparently unknown in the midland counties to the north and west of the area considered here. The collection as a whole shows that the fauna of the area has much closer affinities with that of the eastern counties than of those of the more central midlands—a comparison which also, it may be noted, holds with respect to climate. The following list of the less common species includes records which may be of interest from the standpoint of distribution.

VESPOIDEA.—*Mutilla europaea* L., a number of both sexes from Wood Walton Fen. *Priocnemis obtusiventris* Schdt., ♂ and 10 ♀♀ from Ashton Wold and Helpstone (Northants) and Wood Walton (Hunts), the ♀♀ with the typical amount of red on the legs. This, together with *P. exaltatus* F., of which there is a long series, and *P. perturbator* Harris, are the three representatives of the genus. Specimens of black *Psammochares* are evenly divided between *nigerrimus Scop.* and *piliventris* Mor. (*cardui*), both species from Ashton Wold and Wood Walton. There is a single ♀ *Ps. cinctellus* Spin., from Ashton Wold, 10.vi.22. Red-bodied species include *Ps. spissus* Sch., ♂ from Wood Walton, and *Ps. gibbus* L., four typical ♀♀ from Wood Walton and Bedford Purlieus. *Deuteragenia hircana* F., ♂ and 6 ♀♀, Ashton Wold; 6 ♀♀, Laxton, Northants. *D. variegata* L., ♀ Castor, and ♀ Wansford, Northants. Among eleven species of *Odynerus* are the following: *O. melanocephalus* Gmel., from two Northants localities; *O. laevipes* Shuck., from Northants and Wood Walton; and *O. antilope* Panz., 2 ♀♀ from Northants. A large number of *O. callosus* Thoms., mostly second brood, were taken at Ashton Wold, where they evidently nest in the mortar of stone walls and buildings. *O. trifasciatus* Oliv. was taken freely at Wood Walton.

SPHECOIDEA.—*Psenulus concolor* Dhlb., ♀ Ashton Wold, 13.vii.22. *Psen equestris* F., ♂, 24.vii.22. *Hoplisus quadrifasciatus* L., specimens from Ashton Wold and Wood Walton. *Trypoxylon figulus* L., taken more freely than the other two species of the genus. The Crabronidae are represented by seventeen species, including the following: *Solenius larvatus* Wesm., both sexes from Wood Walton, and one ♀ from Ashton Wold, in 1922: 5 specimens as against 67 of the commoner *S. vagus* L. *Metacrabro lituratus* Panz., 6 specimens from four localities. *Blepharipus vagabundus* Panz., ♀ Wood Walton, 26.vi.23. *Cuphopterus serripes* Panz. (*dimidiatus*), a long series from several localities, mostly Ashton Wold. Among others are *Coelocrabro ambiguus* Dhlb., *C. capitosus* Shuck., *C. nigritus* Lep., and *Ablepharipus podagricus* v.d.L., all from Ashton Wold.

APOIDEA.—*Colletes* is represented by one specimen of *C. similis* (*picistigma*), ♀, Ashton Wold, 27.vii.22, and a series of *C. daviesanus* Sm. Of *Prosopis* there are six species: *P. cornuta* Sm., one ♀, Ashton Wold, 27.vii.22; *P. confusa* Nyl., a number, from several localities, in both counties; *P. annularis* K. (*dilatata*), 2 ♀♀ (Northants); *P. communis* Nyl., and *P. hyalinata* Sm., a number of both; and *P. pectoralis* Först (*kriechbaumeri*). The latter appears to be common at Wood Walton Fen, as it is in Cambridgeshire, and several were also taken at Ashton Wold. The galls of the Oscinid fly, *Lipara lucens,* which provide the only known nesting site of *pectoralis* in Britain, have been seen in both the above localities. *Sphecodes rufiventris* Panz. (*rubicundus*), ♂, Ashton Wold. *S. crassus* Thoms., Laxton, Northants. *Halictus fulvicornis* K. a number from several localities, but none of its ally, H. *fratellus* Perez. *H. lativentris* Sch. (*decipiens*), five Northants specimens. *Andrena fulva* Schr., ♀, Ashton Wold. *A. praecox* Scop., 2 ♀♀, Ashton Wold. *A. varians* Rossi, both sexes, Ashton Wold, including a ♀ of var. *mixta* Sch. *A. marginata* F. (*cetii*), a series taken at Helpstone, Northants, in July and August. *A. nigriceps* K., ♀, Wood Walton; ♂, Castor, Northants. *A. denticulata,* ♀, Ashton Wold. *A. coitana* K., 2 ♀♀, Wood Walton. *A. minutula* K., a number, mostly second brood, from various localities. *A. minutuloides* Perk., ♂, Ashton Wold, 11.viii.22. *A. dorsata* K., a number of both broods, from Wood Walton, Ashton Wold, and other localities. *A. ovatula* K., ♂, Ashton Wold. *Cilissa melanura* K., ♀, Ashton Wold. *Macropis labiata* F., several specimens from Wood Walton Fen. *Nomada flava* Panz., ♀, Ashton Wold. *N. furva* Panz., ♀, Ashton Wold. *Osmia bicolor* Sch., single specimens from Ashton Wold, Bedford Purlieaus, and Wansford (Northants). *O. pilicornis* Sm., Northants and Wood Walton. *O. spinulosa* K., Ashton Wold, Helpstone (Northants), Wood Walton (Hunts). *Stelis phaeoptera* K., ♂, Wood Walton. *Megachile versicolor* Sm., from five localities, and apparently commoner than *M. centuncularis* L. A *versicolor* ♀ from Ashton Wold has its scopa whitish throughout, in place of the typical red colouring.

The incidence of stylopisation among species of *Andrena* is as follows :— *A. jacobi* Perk., 10 out of 107 ; *A. nigroaenea* K., 1 out of 45 ; *A. chrysosceles* K., 3 out of 117 ; *A. minutula* K., 0 out of 66.

A word may be said on certain differences between the Aculeate fauna of Wood Walten Fen and that of Wicken Fen, Cambridgeshire.* To some extent, at least, these can be related to the habitats which the localities provide. *Crabro cribrarius* L. was taken plentifully at Wood Walton, as well as a number of *Mutilla europaea,* as recorded above. Neither are known to occur at Wicken. It would appear that the sides of the droves and other banks in the former locality, through the soil being drier or more easily worked, provide more adequate nesting-sites for species which burrow in the ground. The occurrence of *Psammochares gibbus, Ps. spissus, Colletes daviesanus, Sphecodes gibbus, Andrena nigriceps,* and *A. tarsata,* all unknown from Wicken, though occurring in neighbouring districts, bears out this conclusion. Another species of which several were taken at Wood Walton, but which is absent from Wicken, is *Cuphopterus serripes.* In this case the greater number of tall trees with dead branches and stumps, together with the fact that Wood Walton is closer to wooded areas where the species is prevalent, may be enough to account for the difference. In addition to the above, two scarcer species, *Odynerus laevipes* and *Solenius larvatus,* both unknown from Cambs., but recorded here from Northants, occurred at Wood Walton. With regard, finally, to resemblances between the two localities, the most notable are the predominance of species which nest in stems and dead wood and the presence of perhaps the two most distinctive species in the fen districts—*Macropis labiata* and *Prosopis pectoralis.*—G. M. Spooner, The Brown House, Weymouth : *March 12th,* 1935.

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* Reference is made to the writer's county list published by the Cambridge Natural History Society in 1930. Since that date some Wicken records have been given by H. P. Jones, Ent. Mo. Mag., LXVIII, p 233.

*Four days Hemiptera Collecting in Suffolk.*—For the second Easter in succession I stayed at Barton Mills in Suffolk, and spent April 19th to 22nd collecting Hemiptera and Coleoptera there and in the neighbouring parish of Tuddenham. Instead of the biting N.E. wind which prevailed last Easter we had sunshine, and although there was a strong wind at times, it was never cold enough to wear a coat, while rain, save for a few drops, was absent in the daytime, Easter Sunday and Monday being quite hot in the sun.

*Sehirus bicolor* L. One morning, walking along a hedgerow to reach some felled tree-trunks I idly swept the herbage, which as the result of a very heavy dew was sodden. On reaching the trunks I looked into the net, hardly expecting to find anything, but discovered one ♀ *S. bicolor.* I returned and swept along the hedgerow once again, but took no more. Returning late that afternoon I swept the part again, still with no result. Reference to habitat suggested nettles, and although nettles (at that time anything up to six inches in height) were swept no *Sehirus* were found. The following morning, thinking that perhaps the dew-soaked vegetation had some connection with the appearance of the bug, I swept this hedgerow again, passing further along it. Although my net was soaked through I took in all ten specimens. Again the evening of that day proved fruitless by sweeping the same spot, but I cannot believe that I denuded it of the bug, so that its occurrence at the time I took the ten remains something of a mystery. I have come to the conclusion that this bug is associated with the Cow-Parsley which occurred among the nettles. Another noticeable fact was that the smallest ♂ was half the size of the largest; a wide sexual difference in size for a bug.

(That *S. bicolor* L. is associated with Cow-Parsley would seem to be a fact, for at Albury in Surrey on April 24th I took five specimens of it in one sweep of the net off that plant.)

*Elasmostethus interstinctus* L. One specimen was found in moss, and it is of interest to note that where moss is referred to it was pulled up from the roots of grass tufts growing openly near a pine wood while a few larch, spruce and birch trees were standing with a few clumps of gorse.

*Elasmucha grisea* L. Three specimens were beaten from Scots pine and spruce, as was one *Troilus luridus* F. *Ischnorhynchus resedae Panz* a large series was beaten of similar trees sometimes one and sometimes a dozen being in the tray at a time.

*Heterogaster urticae* F. A large tarpaulin used as a stack cover, lying on a bed of nettles beside a stack of reeds was turned over, and several species of Coleoptera were taken. The sun was shining and I cannot help feeling that *H. urticae* must have flown on to the tarpaulin because three of us searched all over the surface of it, and it was not until we had thoroughly disturbed it and gone over it again that this bug appeared. Two further visits were made to this spot, and finally I secured a series of this bug both from the top and beneath the cover. At first it seemed as though the bugs had flown from the stack of reeds, which lay to windward of us, but shaking bundles of them over the tarpaulin brought none to light. One specimen of *Pamera fracticollis* Schill. was taken in moss in company with *Rhyparochromus chiragra* var. *sabulicola* Thoms.* four *R. dilatatus* H.S. A single *R. praetextatus* H.S. was caught running on the tarpaulin. A pair of *Plinthisus brevipennis* Latr. were found in moss with a short series of *Peritrechus geniculatus* Hahn., *P. sylvestris* Fabr.,

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* Apropos this variety, Butler in his 'Biology Brit. Hem-Het.' refers to a series taken in Tuddenham and by a strange coincidence mine was actually taken in this parish.

*Drymus brunneus* Sahlb. and *D. sylvaticus* F., while *Scolopostethus affinis* Schill. and *S. thomsoni* Reut. occurred generally.

*Gastrodes ferrugeneus* L. occurred by beating, and the fresh growth of larch, which was just out, produced two *Tingis cardui* L. and a pair of *Physatochila dumetorum* H.S. A female *Acompocoris pygmaeus* Fall. was beaten from spruce and one *Triphleps majuscula* Reut., while *Piezostethus cursitans* Wolff. occurred occasionally under bark. *Cardiastethus fasciiventris* Garb. occurred in numbers by beating spruce, Scots pine and gorse about a mile from where I took it last Easter.

Capsids were, naturally, only represented by a few species, *Lygus pratensis* L. occurring occasionally, and *Camptobrochis lutescens* Schill., *Liocoris tripustulatus* F. and *Notostira erratica* L. completing the list. The water net proved very unproductive both with this order and Coleoptera, one specimen of *Naucoris cimicoides* L. being taken and two species of *Corixa*.

Once again I am indebted to Mr. H. Britten for access to his collection of Hemiptera for comparison and for his help in naming several difficult species.—H. R. P. COLLETT, 'Lauriston,' Park Road, Timperley, Cheshire. *May 11th, 1935.*

## Society.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON. *Wednesday, April 3rd,* 1935.—DR. S. A. NEAVE, O.B.E., President, in the Chair.

The following were elected Fellows of the Society: Dr. Wilhelm Junk, Scheveningsche Weg, 74, The Hague, Holland; Professor Clarence E. Mickel, Ph.D., Division of Entomology and Economic Zoology, University of Minnesota, St. Paul, Minnesota, U.S.A.; Frederick George Michael Westropp, 80 St. George's Square, S.W.1.

The death of Mr. G. H. Gurney, elected a Fellow of the Society in 1906, was announced.

Professor G. D. Hale Carpenter exhibited (1) [on behalf of the late F. A. Dixey] an unusually dark form of the female of *Belenois thysa*, and (2) an all-female family of *Hypolimnas bolina* bred by Mr. H. W. Simmonds in Fiji. Mr. G. J. Arrow discussed the undesirability of establishing genera based on characters not common to both sexes, or of the giving of names similar to generic names to groups lower than genera, which was followed by a discussion during which general agreement was expressed with his views. Dr. Llewellyn Lloyd discussed bacteria beds of sewage works as an environment for insects, illustrating his remarks with lantern slides.

*Wednesday, May 1st,* 1935.—DR. S. A. NEAVE, O.B.E., President, in the Chair.

The following were elected Fellows of the Society: Richard William Parker, Woodlands, Pen-y-Gardden, Ruabon, Near Wrexham; Roger Verity, M.D., 36 Via Masaccio, Florence, Italy.

The President read the loyal address presented to His Majesty the King on behalf of the Council on the occasion of the Silver Jubilee.

The death of Mr. H. C. Hayward, elected a Fellow of the Society in 1919, was announced.

The Secretary, on behalf of Mr. Oswald H. Latter, read some notes on unusual length of life of larva of *Cossus ligniperda*.

Sir Edward Poulton, F.R.S., read an early record of birds trained to catch butterflies, by Major Leonard Darwin.

Dr. H. Bytinski-Salz recorded two new moth hybrids.

Mr. Hugh Main exhibited (1) some cocoons of *Zerinthia rumina* and (2) yellow specimens of *Pieris napi*.

Mr. H. M. Edelsten exhibited a piece of birch stem attacked by woodpeckers in search of wood-boring beetles.

The following papers were read: 'The biology and distribution of *Rhizopertha dominica*,' by C. Potter; 'The genus *Aptinothrips*, Haliday,' by E. R. Speyer; 'The origin of Gynandromorphs in the Lepidoptera from binucleate ova,' by E. A. Cockayne; 'The times of activity of certain nocturnal insects, chiefly Lepidoptera,' by C. B. Williams; 'Notes on the nomenclature of the Aculeate Hymenoptera, with special reference to the British genera and species,' by O. W. Richards; 'New Trichoptera and Plecoptera from France,' by M. E. Moseley.—A. W. McKenny-Hughes, *Hon. Secretary.*

## THE PARASITES OF BRITISH BIRDS AND MAMMALS. IV.—RECORDS OF BAT PARASITES.

BY GORDON B. THOMPSON

(Department of Entomology, Brit. Mus. (Nat. Hist.)).

For the greater part of the material on which these records are based I am indebted to my friend Mr. Michael Blackmore. I have also to thank Messrs. H. M. Hallett and J. N. Taylor for their kindness in sending me material that is also included in this note.

Bats are notorious harbourers of parasites, and they offer a very interesting field to parasitologists. The parasites so far recorded from these hosts in the British Isles represent at least seven groups of Arthropoda, namely:—Nycteribiidae, Cimicidae, Siphonaptera, Ixodoidea, Parasitoidea, Sarcoptoidea and Trombidoidea. The Siphonaptera are perhaps better known than any other group; Nycteribiidae and Cimicidae have only been recorded on very rare occasions, and the Acarine records are extremely scattered; in fact, as far as I am able to gather from the literature, ticks and many species of mites have been recorded from the Continent, but not from the same hosts in the British Isles. Much work requires to be done on these Arthropod parasites if we are to learn anything of their exact distribution on the bats occurring in our islands. Twelve species of bats are known from the British Isles, and two other species have each been recorded on a single occasion.

For the determination of the mites I have to thank Dr. H. Graf Vitzthum, and for his kindness in checking my determination of the Argasid I must thank Mr. C. Warburton. I should like also to express my gratitude to Dr. Susan Finnegan for much kind help with the Acarina.

## ACARINA.

Argasidae. IXODOIDEA.

*Argas vespertilionis* (Latreille), 1796.

Precis Caract. Ins., p. 177.

Ticks: Mon. Ixod., 1908, i, p. 34, t.f. 48-57, pl. 1, f. 4, 5.

Twelve larvae from *Pipistrellus pipistrellus* (Schreber) (Common pipistrelle), adult ♂, Devon, Ilfracombe, Langleigh Farm, 14.v.1934 (*M. Blackmore*).

Fourteen larvae from *P. pipistrellus* (Schreber), immat. ♂, Devon, Ilfracombe, Langleigh Farm, xi.1933 (*M. Blackmore*).

Eighteen larvae from *P. pipistrellus* (Schreber), S. Wales, Cardiff, 1.vi.1934 (*H. M. Hallett*).

One larva from *Eptesicus serotinus* (Schreber) (Serotine bat), Kent, Faversham, 25.viii.1934 (*M. Blackmore*).

One larva from *Myotis mystacinus* (Kuhl) (Whiskered bat), adult ♀, Devon, Ilfracombe, Langleigh, 24.ix.1934 (*M. Blackmore*).

*Argas vespertilionis* (Latreille) has only been recorded from *P. pipistrellus* (Schreber) by Garner (1844) from Staffordshire, and by Nuttall and Warburton (1908), nymphs and larvae from the same host at Histon, Cambridgeshire, 11.v.1905 and 29-30.vii.1908. The records given above are, therefore, useful additions to our knowledge of the distribution of the species and shows that it parasitises at least three species of bats in the British Isles. Up to 1908 there was no extant description of the adults of this species, and then only the female was described by Nuttall and Warburton (1908). It appears from the records that the immature stages, especially the larvae, are fairly numerous when found on a bat. The females and the males have never been found in our islands. Adult specimens should be looked for in the haunts of their hosts especially amongst their excrement.

All the parasites here recorded were collected either from the dorsum or the breast of their hosts.

Parasitidae. PARASITOIDEA.

*Spinturnix murinus* Walckenear, 1847.

Ins. Apt., v, p. 545.

Four specimens from *M. mystacinus* (Kuhl), Gloucester, nr. Cheltenham, Cranham Caves, iv.1933 (*J. N. Taylor*).

This species is very common on all European bats.

*Spinturnix* sp.

Specimens from *E. serotinus* (Schreber), Kent, Faversham, 25.viii.1934 (*M. Blackmore*).

Concerning these specimens Dr. Vitzthum writes that the species is known to him but cannot be given a name from the literature: it is in all probability one of the scarcely distinguishable species described by Kolenati.

In both cases these mites were taken on the wings of their hosts.

For further records of *Spinturnix* spp. from British bats see Hirst (1927).

Dermanyssidae.

*Ceratonyssus musculi* (Koch), 1836.

Two protonymphs from *P. pipistrellus* (Schreber), adult ♂, Devon, Ilfracombe, Langleigh Farm, 14.v.1934 (*M. Blackmore*).

Two protonymphs from *P. pipistrellus* (Schreber), adult ♀, Devon, Ilfracombe Reservoirs, 29.v.1934 (*M. Blackmore*).

Adults from *E. serotinus* (Schreber), Kent, Faversham, 25.viii. 1934 (*M. Blackmore*).

All the specimens of *C. musculi* (Koch) were taken on the underside of the wings. This parasite was originally described from *Mus musculus* Linn. but appears to occur commonly on bats.

Trombidiidae.

*Trombicula autumnalis* (Shaw).

Larvae from *Myotis nattereri* (Kuhl) (Natterer's bat), adult ♂, N. Devon, nr. Baunton, Spreacombe Mine, 24.ix.1934 (*M. Blackmore*).

This form of *T. autumnalis* (Shaw) is the well-known 'harvest-bug.' I cannot say for certain whether it has previously been taken on bats in the British Isles: it occurs commonly on the small mammals such as mice and voles, especially in their ears. Three specimens were collected from the fur on the breast.

## INSECTA.

### SIPHONAPTERA.

Ischnopsyllidae.

*Ischnopsyllus octactenus* (Kolenati), 1856.

Parasit. Chiropt., p. 31, No. 1, pl. 3, f. 31 (♂), and Hor. Soc. Ent. Ross. (1863), ii, p. 42, No. 21, pl. 4, f. 12 (♀).

Rothschild, Ent. Mon. Mag., 1915, p. 86, f. 87.

One male from *M. mystacinus* (Kuhl), adult ♀, Devon, Ilfracombe, Langleigh, 24.ix.1934 (*M. Blackmore*).

One female from *M. mystacinus* (Kuhl), Devon, Ilfracombe, iv.1934 (*M. Blackmore*).

One male and five females from *P. pipistrellus* (Schreber), adult ♀, Devon, Ilfracombe Reservoirs, 29.v.1934 (*M. Blackmore*).

Two females from *P. pipistrellus* (Schreber), Radnor, Boughrood, 10.ix.1934 (*J. G. Williams*).

Three females from *M. nattereri* (Kuhl), adult ♂, N. Devon, nr. Braunton, Spreacombe Mine, 24.ix.1934 (*M. Blackmore*).

Considering the species of bats from which the above specimens were obtained, it is disappointing that *I. octactenus* (Kolenati) was the only flea found. It is, I believe, the commonest British bat-flea. The fleas were, with the exception of the six specimens taken off *P. pipistrellus* (Schreber), which were on the dorsum, all collected from the fur on the breast of their hosts.

Nycteribiidae.

### DIPTERA-PUPIPARIA.

*Nycteribia* (*Listropodia*) *pedicularia* (Latreille), 1805.
Hist. Nat. Crust. et Ins., xiv, p. 403, pl. 112, f. 14.

One male from *Rhinolophus ferrum-equinum insulanus* Barrett-Hamilton (Greater horseshoe-bat), adult ♀, N. Devon, nr. Braunton, Spreacombe Mine, 24.ix.1934 (*M. Blackmore*).

Two species only of Nycteribiidae, or bat-flies, are found on British bats (Scott, 1934). The specimen here recorded was collected from the fur under the chin of the bat.

'*Acanthophthirius etheldredae* Perkins.'—As I have frequently been asked about this 'louse,' which was described by Perkins (1925), and mentioned by Bagnall (1932), I should like to take this opportunity of pointing out that it was an immature mite, as stated by Ferris (1932). The type is in the Molteno Institute, Cambridge, and the single specimen upon which the description was based was taken off a pipistrelle in Ely Cathedral.

### *Note to collectors of ectoparasites.*

In connection with a projected survey of the arthropod parasites of our birds and mammals, of which these notes* form a part, I consider it of importance to include the position of the parasite on its host and, whenever possible, the sex of the host with every record.

### SUMMARY OF THE RECORDS.

| HOSTS. | PARASITES. |
|---|---|
| *P. pipistrellus* (Schreber). | (I) *Argas vespertilionis* (Latr.). |
| | (A) *Ceratonyssus musculi* (Koch). |
| | (S) *Ischnopsyllus octactenus* (Kolenati). |

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* See E.M M. (1934).

| Hosts. | | Parasites. |
|---|---|---|
| *M. mystacinus* (Kuhl). | (I) | *Argas vespertilionis* (Latr.). |
| | (A) | *Spinturnix murinus* Walck. |
| | (S) | *Ischnopsyllus octactenus* (Kolenati). |
| *M. nattereri* (Kuhl). | (A) | *Trombicula autumnalis* (Shaw). |
| | (S) | *Ischnopsyllus octactenus* (Kolenati). |
| *E. serotinus* (Schreber). | (I) | *Argas vespertilionis* (Latr.). |
| | (A) | *Ceratonyssus musculi* (Koch). |
| | (A) | *Spinturnix* sp. |
| | (S) | *Ischnopsyllus octactenus* (Kolenati). |
| *R. ferrum-equinum insulanus* Barrett-Hamilton. | (N) | *Nycteribia* (*Listropodia*) *pedicularia* (Latr.). |

(I) = Ixodoidea. (A) = Acarina (Mites). (S) = Siphonaptera. (N) = Nycteribiidae.

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British Museum (Natural History),
Cromwell Road, London, S.W.7.
*March*, 1935.

## NEW SPECIES AND FORMS OF AFRICAN LYCAENIDAE (LEP. RHOP.).

BY G. TALBOT, F.R.E.S.

(Plates I—III.)

(*Concluded from p.* 127.)

### 44. *Uranothauma antinorii* Ob. ♀ f. **albicans** nov.

(Pl. II, Fig. 13.)

The typical female from Abyssinia is the fuscous one without white colouring above. This was described by Ungemach, Mém. Soc. Sci. Nat. Maroc 32, p. 89, 1932. There is a specimen in the Hope Museum.

The form which occurs in Kenya and Tanganyika Territory resembles *falkensteini* Dew. in the extent of the white areas on both wings. The markings of the upperside are also similar, though the subapical band on the fore-wing is curved.

*Hab.*—In the Hope Museum from S.E. Rhodesia, Melsetter, 3,800 ft., 4-5.iv.1907 (*C. F. M. Swynnerton*). Kenya: Mau Escarpment, Lumbwa, ca. 7,000 ft., June, 1920 (*H. L. Andrewes*) (type); id., March, 1921, one; Cherangani Hills, 6,200 ft., 40 miles east of

Elgon, 10.ii.1925 (*C. R. S. Pitman*), one; Kongwa, ca. 210 miles west of Dar-es-Salaam, 27.iv.1927 (*K. St. A. Rogers*), one. Also in B.M. from Hoeysbridge, and from Itumba in Tanganyika Territory.

### 45. *Uranothauma cordatus* Shpe. ♀.

This sex does not appear to have been described, and is extremely rare.

Resembles above the ♀ of *nubifer* Trim. On the forewing the marginal black is of even width to the tornus. The discal spot in 2 is placed proximally to the one in 3, and the spot below vein 2 is placed under the one above it. These two lower discal spots are well marked on the underside.

In the B.M. (*Coll. Joicey*) from N.W. Kivu (neallotype) and W. Uganda (two specimens).

### 46. *Uranothauma falkensteini* Dew. ♀ f. **umbra** nov.

On the upperside the white areas are almost entirely or are entirely suppressed by a suffusion of the ground-colour.

Type specimen from Dabida, ca. 100 miles north-west of Mombasa, Wusi, ca. 4,200 ft., 20.v.1908 (*K. St. A. Rogers*); id., 30.v. 1904; id., 11.ii.1911; id., 12.ii.1912; id., 1.iv.1916. Also from Taveta, 22.xii.1903 (*K. St. A. Rogers*). In the B.M. a specimen from KENYA: Hoeysbridge, 1924 (*C. R. S. Pitman*). This shows no trace of white on upperside.

### 47. **Cacyreus palemon ghimirra** subsp. nov.

(Pl. II, Fig. 20.)

♂ ♀. Upperside not different from the typical form. Underside darker owing to reduction of white scaling and thinner white markings. On the hind-wing the space between the two costal spots is wider. The white spot in 3 is shorter. The ♀ shows only a slight trace of blue on the upperside.

*Hab.*—S.W. ABYSSINIA: Shoa Ghimirra Prov., Jan., 1925, 4 ♂♂, 1 ♀ (type ♂ 25.i, type ♀ 18.i); Nados Prov., Ganji River, 5,500 feet, 7.ii.1925, 1 ♀; Burtura, Shoa Ghimirra Prov., 28.i.1925, 1 ♂; Maji, 16.iv.1925, 1 ♀; below Gore, 6,000 ft., 18.xii.1926, 1 ♀; Anderacha, 3.ii.1927, 1 ♀. All collected by Arnold Hodson.

### 48. *Castalius margaritaceus* Shpe. f. **phasma** f. nov.

(Pl. II, Fig. 14.)

In this form the underside markings are only faintly indicated, and the discal spot on the hind-wing is usually entirely absent.

This form appears to occur frequently with the typical one both in Kenya and Uganda.

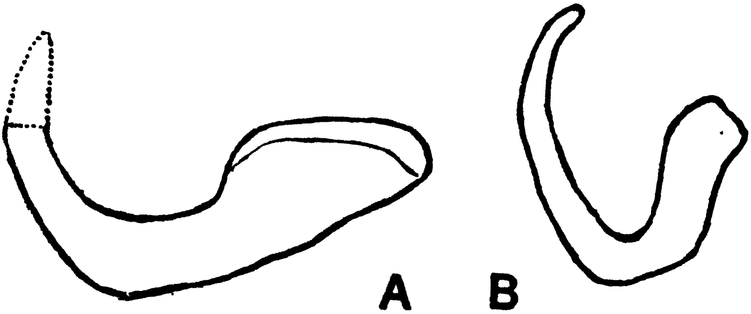
Type specimen a ♂ from KENYA: East Trans-Nzoia, 40 miles east of Elgon, Cherangani Hills, 6,200 ft. (*C. R. S. Pitman*).

### 49. *Castalius ertli* Auriv. **kaffana** subsp. nov.

### (Pl. II, Fig. 17.)

♂ ♀. Upperside of the forewing with the white band anteriorly narrower, its outer edge more irregular than the typical form. The projection in the cell is triangular and sometimes its apex reaches the upper margin of the cell. Hindwing without a white submarginal line. Post-discal spots in 1c—5 usually fused with the marginal black.

Underside of forewing differs distinctly from *ertli* in having the lower basal stripe separated from the costal stripe, being only joined to it at the base.



Genitalia of *Castalius*.

Fig. 3.—A, one of the falces of *C. ertli kaffana* Talb.; B, one of the falces of *C. ertli* Auriv.

Genitalia (fig. 3). The most obvious divergence from the typical form is found in the shape of the falces. These are shorter and much broader, with a gradual curve. In *ertli* (fig. 3*b*) they are longer, rather slender, and strongly curved.

*Hab.*—South-west Abyssinia: Nado's Province, Yeki, 4,950 feet, 3.ii.1925, 2 ♂♂ (type); Mocha District, Gamadura, 6,200 ft., 22.ii.1925, 1 ♀ (allotype). The long series of this insect from various localities in South-west Abyssinia contained only two females.

### 50. *Azanus tongidensis* B.-Bkr. ♀.

### (Pl. II, Fig. 19; Pl. III, Fig. 16.)

Upperside without blue basal area. Underside much paler than the ♂.

♀ neallotype from Kenya: E. Trans-Nzoia, 40 miles east of Elgon, Cherangani Hills, 6,200 ft., 7.ii.1925 (*C. R. S. Pitman*).

An extremely rare species, as only the ♂ type appears to be known in addition to this specimen.

### 51. **Everes micyclus distincta** subsp. nov.

### (Pl. II, Figs. 15 and 18.)

♂. Upperside with dark marginal borders as in *micyclus*, broader in a specimen from Uganda. Underside of forewing with distinct and separate post-discal spots, not marks as in typical form; these and the discocellular mark are much darker than in the typical form. On the hindwing the post-discal series is placed nearer the cell so that the spot in 2 comes almost beneath the discocellular mark. The two black costal spots are placed a trifle closer together.

♀. Forewing above with pale blue proximal area as far as the post-discal spots. These spots are smaller than in the typical ♀. In cellules 2 and 3, between the spots and the dark border, there is a whitish bar. Hindwing as in typical ♀ except that the submarginal white spots are strongly marked. Underside as in the ♂.

*Hab.*—N.E. RHODESIA: Luwingu to mouth of Chambezi River, 10.x.1908, 3 ♂♂ (*S. A. Neave*) (type); Chinsali, 4,300 ft., April, 1908, 1 ♀ (*S. A. Neave*); L. Young to Mpika, November, 1908, 1 ♂ (*S. A. Neave*); N. Lake Bangweolo, 4,200 ft., Luwingu, 1.i.1908, 1 ♀ (*S. A. Neave*). N.W. RHODESIA: Alala Plateau, Ndola District, 2 ♂♂. W. UGANDA: Toro, 7,000—9,000 ft., xi, xii.1900, 1 ♂ (*C. A. Wiggins*). UGANDA: W. Buddu, Malabigambo Forest, Katera, xi.1933, 1 ♀ (*T. H. E. Jackson*) (allotype). Also in the B.M. (*Coll. Joicey*) from E. CONGO: Urindi District, Upper Ruvubu River, vii, viii.1919, ca. 1,700 metres, 3 ♂♂.

### 52. **Lepidochrysops subvariegata** sp. nov.

(Pl. II, Fig. 16; and Pl. III, Fig. 15.)

Allied to *carsoni* Butl. from Fwambo, and to *variegata* B.-Bkr. from Kenya, being nearest the latter.

♂. Upperside pale blue as in *variegata*, with a narrower discocellular spot and thinner black edging to both wings. Hindwing with black marginal spot, edged with yellow proximally, as in *variegata*.

Underside coloured as in *variegata*, smoky-grey with white markings. On the forewing the anterior four spots of the post-discal band are placed in a straight line, the spot in 2 more proximal, and the one below it in line with it. The white inner border to the dark submarginal band is narrower than in the allied form. Hindwing with five rounded black spots as in *variegata*, the one on the inner margin in 1*a* being as large as the others. The post-discal band is not connected with the discocellular spot by a white bar as in *variegata*. It is formed of a curved series of six rounded spots between veins 1*b* and 6; the spots in 4 and 5 are placed below the one in 6, and the posterior three are more proximal. The submarginal triangular white marks are not so heavy as in *vangeata*, and the marginal dark spots are smaller. A marginal black spot in 2 as on upper side, with a smaller and similar spot in 1*c*.

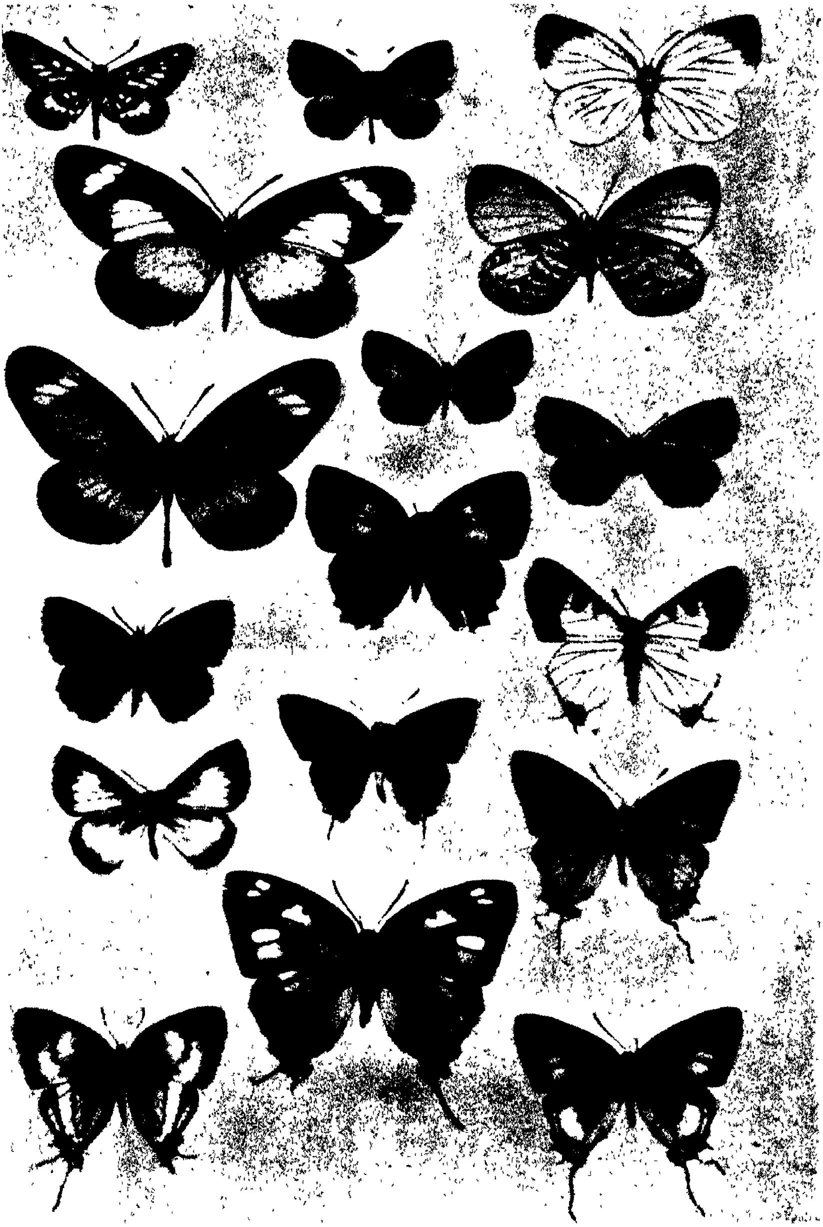
The chief difference on the hindwing from *variegata* is in the position of the post-discal band, which is more evenly curved, and the anterior spot is not separated.

This insect may be a race of *variegata*.

*Hab.*—ABYSSINIA: Dirre Dawa, 23.vii.1908 (*R. E. Drake-Brockman*), 1 ♂ in the B.M.

PLATE I.

Ent. Mo. Mag., 1935



NEW AFRICAN LYCAENIDAE.

# EXPLANATION OF PLATES I—III.

## PLATE I.

(All the figures four-fifths natural size.)

FIG. 1. *Alaena kagera*, sp.n., ♂. Type. Hills on west side of Kagera R., Tanganyika Territory; 30° 55′ E., 2° 5′ S.; dry season; 16.vi.1916. G. D. Hale Carpenter.

,, 2. *Mimacraea krausei*, f.n. *viviana*, ♀. Type. Uganda, Bunyoro, Bugoma forest; 3,700 feet; cool and dense; 1.xii.1911. S. A. Neave.

,, 3. *Mimacraea krausei*, f.n. *elgonae*, ♂. Type. Uganda, Siroko river near western foot of Mt. Elgon; 3,600 feet; dense forest strip; 13.vii.1911. S. A. Neave.

,, 4. *Teriomima minima*, f.n. *stygia*, ♂. Type. Mombasa, Rabai; 700 feet; 21.xii.1909. Canon K. St. A. Rogers.

,, 5. *Liptena hapale*, sp.nov., ♀. Type. Uganda, Bunyoro, Budongo forest; Aug.-Sept. 1934. T. H. E. Jackson.

,, 6. *Liptena flavicans*, f.n. *oniens*, ♂. Type. Oni, 70 miles east of Lagos; forest; dry season; 10.iii.1912. W. A. Lamborn.

,, 7. *Eresina crola*, sp.n., ♀. Type. S.W. Uganda, Lake Edward, near mouth of Ntungwe river; about 3,000 feet; 19-24.ix.1922. G. D. Hale Carpenter.

,, 8. *Eresina bilinea*, sp.n., ♀. Type. Under surface. Kenya Colony, Kavirondo, Kakamega; 25.vi.1931. T. H. E. Jackson.

,, 9. *Lachnocnema disrupta*, sp.n., ♂. Holotype. S.W. Uganda, Kigezi district, Chahafi, in Rift Valley; about 6,500 feet; 7.ix.1921. G. D. Hale Carpenter.

,, 10 *Lachnocnema disrupta*, sp.n., ♀. Allotype. N.E. Rhodesia, Kasama district, Chambezi valley; 3,900 feet; 7.v.1908. S. A. Neave.

,, 11. *Deudorix* (*Hypokopelates*) *otraeda* Hew., ♀. Belgian Congo, Haut Congo, Basankusu, Bongandanga; 13.iii.29. Gertrude Vinall.

,, 12. *Deudorix* (*Hypokopelates*) *anetia*, f.n. *anetta*, ♂. Type. Under surface. Olokemeji, 90 miles north of Lagos; 277 feet; January, 1911. L. S. Noble.

,, 13. *Pseudaletis clymenus*, f.n. *subangulata*, ♂. Type. Sierra Leone, Regent, three miles south-east of Freetown; 24.x.1911. (The late) G. A. Foster.

,, 14. *Hypolycaena liara*, f.n. *plana*, ♂. Allotype. N.E. Rhodesia, mouth of the Chambezi to Mansya river and Lake Young; 4,500 feet; 29.x.1908. S. A. Neave.

,, 15. *Hypolycaena liara*, f.n. *plana*, ♀ Holotype. Same as 14, except 25.x.1908.

,, 16. *Hypolycaena buxtoni*, ♀, f.n. *divisa*. Type. N.E. Rhodesia, Lake Young to Mpika; 6.xi.1908. S. A. Neave.

,, 17. *Stugeta bowkeri*, f.n. *nyasana*, ♀. Allotype. Under side. Nyasaland, Maiwale, 12 miles east of Fort Johnston; 3,200 feet; 25.ii.1923. W. A. Lamborn.

## PLATE II.

(All the figures about three-quarters natural size.)

FIG. 1. *Pseudiolaus poultoni* Riley, ♀. Neallotype. Kenya Colony, Sagalla Mt., about 100 miles W.N.W. of Mombasa; about 3,500 feet; 29.xii.1916. Canon K. St. A. Rogers.

,, 2. *Epamera tajoraca*, f.n. *haemus*, ♂. Type. Kenya Colony, south-east slopes of Mt. Elgon, 18 miles south-west of Kitale; October, 1933. T. H. E. Jackson.

„ 3. *Epamera aphnaeoides nasisii* Riley, ♂. Neallotype. South-west Uganda, Kigezi district, Ruanda, eastern escarpment of Rift valley, Behungi; about 8,300 feet; 8.ix.1921. G. D. Hale Carpenter.

„ 4. *Epamera aemulus*, ♀, f.n. *apatosa*. Type. Near Mombasa, Chalani, about 15 miles north of Rabai; about 600 feet; 9.vi.1911. Canon K. St. A. Rogers.

„ 5. *Pseudiolaus poultoni* Riley, ♂. Data as for Fig. 1, except 5.iv.1915.

„ 6. *Spindasis aderna*, f.n. *pan*, ♀. Type. Kenya Colony, South Kavirondo, Ugaia; about 3,800 feet; January, 1903. C. A. Wiggins.

„ 7. *Aphnaeus coronae*, sp.n., ♂. Type. South Sudan, Mongalla Station; June, 1930. Captain I. G. Owen.

„ 8. *Lycaenesthes saddacus*, sp.n., ♂. Type. Abyssinia, Lake Saddaca; 8.viii.1908. Lieut.-Col. R. E. Drake-Brockman.

„ 9. *Axiocerses harpax*, f.n. *kadugli*, ♂. Type. Southern Sudan, Nuba hills between El Obeid and Lake No, Kadugli; 29.xii.1904. Lieut.-Col. R. S. Wilson.

„ 10. *Lycaenesthes wilsoni*, sp.n., ♀. Type. South-west Abyssinia, Kuron river; 3,300 feet; 28.iv.1925. Arnold Hobson.

„ 11. *Lycaenesthes ochreofascia*, sp.n., ♀. Allotype. Lake Victoria, Sese Islands, north-east corner of Bugalla Isle; 13.xii.1912. G. D. Hale Carpenter.

„ 12. *Lycaenesthes hodsoni*, sp.n., ♂. Paratype. South-west Abyssinia, Kibish river; 6° 1′ N., 35° 28′ E.; 2,800 feet; 28.ix.1925. Arnold Hodson. The type and two other paratypes bear the same data.

„ 13. *Uranothauma antinorii*, ♀, f.n. *albicans*. Type. Kenya Colony, Lumbwa, on west slope of Mau Escarpment; about 7,000 feet; June, 1920. H. L. Andrewes.

„ 14. *Castalius margaritaceus*, f.n. *phasma*, ♂. Type. Under side. Kenya Colony, East Trans-Nzoia, Cherangani Hills; 6,200 feet; 1923-24. Captain C. R. Pitman.

„ 15. *Everes micylus*, f.n. *distincta*, ♂. Type. North-east Rhodesia, Luwingu to mouth of Chambezi river; 10.x.1908. S. A. Neave.

„ 16. *Lepidochrysops subvariegata*, sp.n., ♂. Type. Abyssinia, Dirre-Dawa; 23.vii.1908. Lieut.-Col. R. E. Drake-Brockman.

„ 17. *Castalius ertli*, f.n. *kaffana*, ♂. Type. South-west Abyssinia, Nado's Province, Yeki; 4,950 feet. Arnold Hodson.

„ 18. *Everes micylus*, f.n. *distincta*, ♀. Under side. Allotype. Uganda, South, Buddu, Malabigambo forest, Katera; November, 1933. T. H. E. Jackson.

„ 19. *Azanus tongidensis* B-B., ♀. Neallotype. Kenya Colony, Eastern Trans-Nzoia, Cherangani Hills; 6,200 feet; 7.ii.1925. Captain G. R. Pitman.

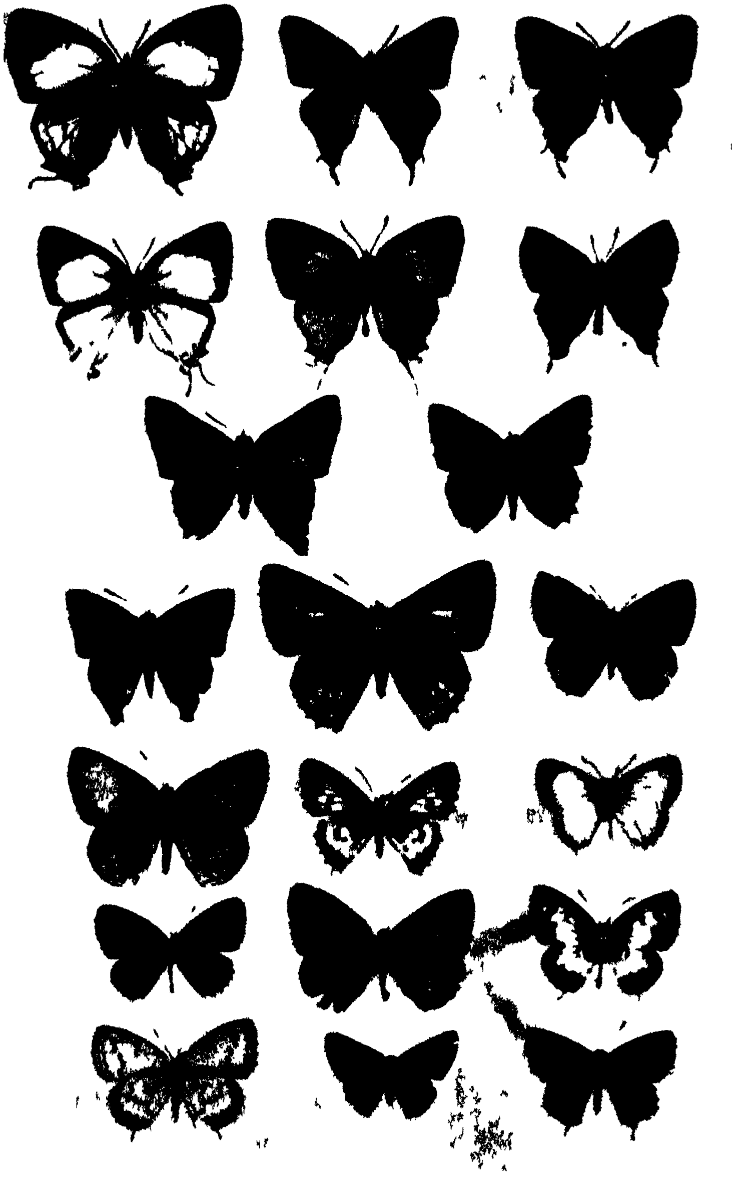
„ 20. *Cacyreus palemon*, f.n. *ghimirra*, ♀. Under side. Allotype. South-west Abyssinia, Shoa Ghimirra Province; 18.i.1925. Arnold Hodson.

## PLATE III.

The undersides of certain specimens figured on Plates A and B.
(All the figures slightly under four-fifths natural size.)

FIG. 1. *Eresina crola.*
„ 2. *Alaena kagera.*
„ 3. *Mimacraea krausei viviana.*
„ 4. *Lachnocnema disrupta*, ♀.

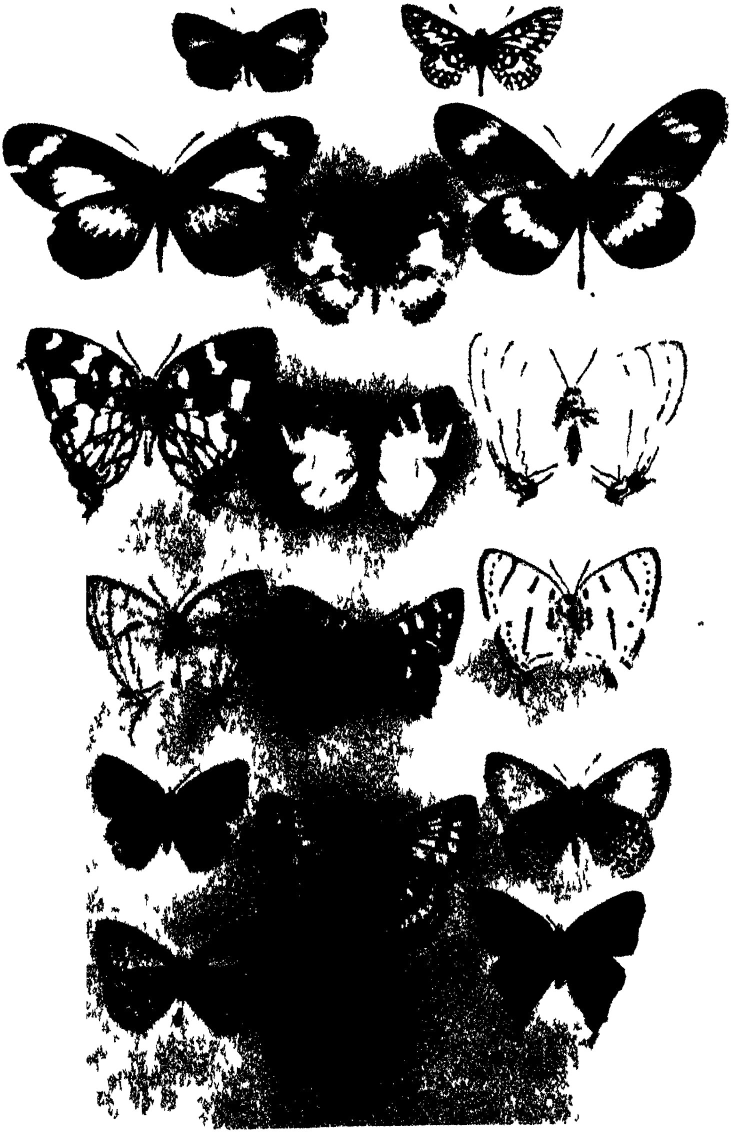
PLATE II



NEW AFRICAN LYCAENIDAE

PLATE III

Ent. Mo. Mag., 1935



NEW AFRICAN LYCAENIDAE

" 5. *Mimacraea krausei elgonae.*
" 6. *Stugeta bowkeri nyasana.*
" 7. *Pseudaletis clymenus subangulata.*
" 8. *Pseudiolaus poultoni*, ♀.
" 9. *Pseudiolaus poultoni*, ♂.
" 10. *Aphnaeus coronae.*
" 11. *Epamera aemulus apatosa.*
" 12. *Lycaenesthes ochreofascia.*
" 13. *Lycaenesthes wilsoni.*
" 14. *Lycaenesthes hodsoni.*
" 15. *Lepidochrysops subvariegata.*
" 16. *Azanus tongidensis.*
" 17. *Epamera tajoraca haemus.*

University Museum, Oxford
(Hope Department).
*February*, 1935.

## NOTES ON THE GALLERIID MOTH *CORCYRA CEPHALONICA* STAINTON.

BY J. M. NICOL, B.SC.

For many years *Corcyra cephalonica* Stainton (Family Galleriidae) has been known as a pest on rice, ground-nuts, cacao, etc., but it does not previously seem to have been found doing much damage to cacao. Munro and Thomson (1) during their survey of the London Docks in 1929 give the island of St. Lucia as the country from which most damage to cacao is recorded. They found no cacao from Venezuela affected by this moth.

An examination of several 'Lists of Intercepted Plant Pests' published by the United States Dept. Agric. Plant Quarantine Bureau shows that *Corcyra* is most often imported into the United States on cacao from Africa. Damage to cacao is also recorded to a lesser extent from other countries, the chief of these being Brazil and Ecuador. Cacao from Central America, Trinidad, Venezuela, Dominica and the Philippine Islands has also been found affected.

Recently, however, in some samples of Venezuelan cacao sent to this country in closed tins, larvae of *Corcyra cephalonica* were found in great numbers. In one tin the damaged beans amounted to twelve per cent. of the total. One larva of *Ephestia elutella* was found, but that the damage was due to *Corcyra* was evident from the great number of larvae of this species and the type of the frass.

*Corcyra* seems to thrive excellently on cacao, and the life-cycle can be completed in a relatively short time.

Chittenden (2) states that during the summer in the United States the life-cycle from egg to egg took 28 to 42 days. At 68°—

70° F. he gives 43 days as the time. In the present instance the times found have been much longer. At 77° F. (25° C.) the complete life-cycle from egg to adult occupied 87 to 100 days, which time was made up as follows: egg 7 days, larva 80 days, pupa 10 days. At 72° F. (22° C.) the length of the stages were: egg 8 days, larva 85 days, pupa 10 days, making a total from egg to adult of 103 days.

During its life the larva eats voraciously and leaves behind frass which can be distinguished fairly readily from that of *Ephestia* and the other storage moths. *Corcyra* frass is much larger and on cacao it seems to be paler in colour than that left by the other moths. This latter observation would, of course, depend to a great extent on the type of cacao concerned.

*Corcyra cephalonica* has been called the 'Rice Moth' (2) because of a supposed preference for rice as a food-material. Although thriving very well on rice it is very catholic in its tastes, and it has also been recorded on maize, linseed, currants, ground-nuts, cacao, chocolate, cocoa-powder, ship's biscuits, etc. Although no reference to the fact can be found in the literature on this insect, it has frequently been found doing considerable damage to locust-beans.

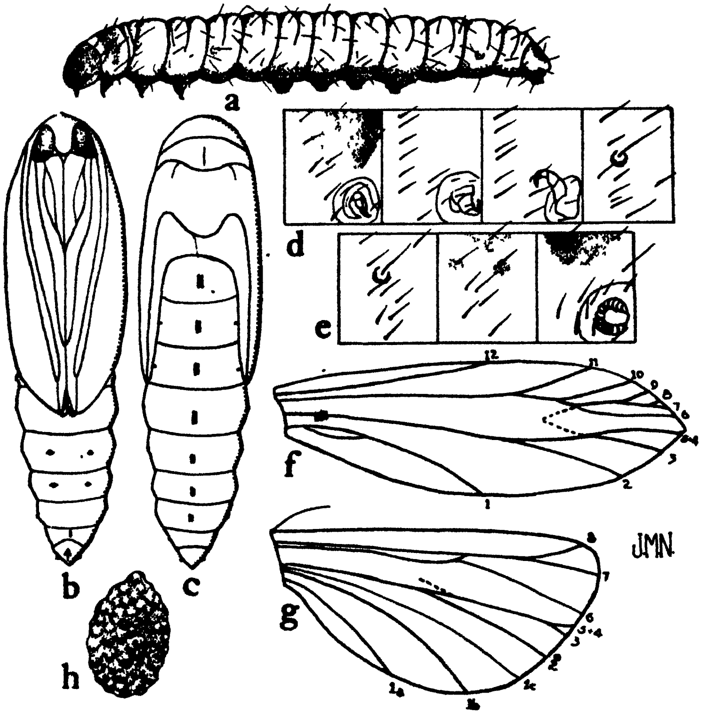
### DESCRIPTION OF THE VARIOUS STAGES.

*Imago.* Fore-wings yellow brown to brown, with two dark, broken, longitudinal lines. Hind-wings cream to pale brown, much fringed. Durrant and Beveridge (3), in their figure of the wings of *C. cephalonica* which has been reproduced by Chittenden (2), show nervure 10 stalked with 11. An examination of the wings of fourteen moths showed that these nervures were more often separate, as in fig. f. The numbers of the various types were: 10 and 11 separate, eleven moths; 10 and 11 connate, two moths; 10 stalked with 11, one moth. The size across the outspread wings varies from 14 mm. to 20 mm., the female being usually larger than the male.

*Egg.* The eggs are yellow-white, lustrous bodies. They are relatively large, measuring 0.6 mm. by 0.34 mm. The surface (fig. h) is tuberculate or granular and there is a small protuberance at one end. The eggs are usually laid on or near suitable food-material and they are kept in place by means of an adhesive substance.

*Larva.* The description of this stage given by Durrant and Beveridge (3) is too short for identifications. The full-grown larvae are stout and about 15 mm. in length. The colour is dirty-white or pinkish. This colour varies within considerable limits, being light when the larvae are fed on a light-coloured food and dark when they are fed on a dark-coloured substance. The setae arise from pale chitinised areas which are just visible to the naked eye. The head capsule is reddish-brown, getting darker towards the mouth. The prothoracic plate is paler than the head capsule, darkening towards the base. The prothoracic suture is well formed and distinct. On the first and eighth abdominal segments a seta arises from a *very definite,* broken, circular chitinised area. The anal plate is bluntly triangulate, pale grey-brown, often darkening towards the anterior edge. On the ninth abdominal segment there is a small, dorsally placed, pale grey-brown cordate plate flanked by two smaller, circular areas each giving rise to a seta.

*Pupa.* The yellow-brown colour becomes darker as the time of emergence approaches. Length 9—12 mm. The eyes are seen as circular areas concolourous with the body, but they become darker and finally black just before transformation. Exposed part of maxillae a little more than half the length of the first pair of legs. Antennae continued almost to end of wings. The anal segment is furnished with two pairs of processes, the larger pair being produced almost into spines. A very distinctive feature of the pupa is to be found on the dorsum. *On seven of the nine abdominal segments viewed dorsally are two short raised median longitudinal lines set very close together and much darker than the body colour.*



*Corcyra cephalonica* Stainton. (*a*) Larva; (*b*) pupa, ventral surface; (*c*) pupa, dorsal surface; (*d*) first, second, third thoracic and first abdominal segments; (*e*) eighth, ninth and anal segments; (*f*) forewing, showing neuration; (*g*) hindwing, showing neuration; (*h*) egg. All much magnified.

This character serves to distinguish the pupa of *Corcyra* from the pupae of the other storage moths, i.e. *Ephestia elutella, E. cautella, Plodia interpunctella,* etc. In the same way the semilunar areas on the first and eighth abdominal segments of the larva give a ready means of distinguishing it from the larvae of the other species. In *Ephestia* and in *Plodia* (in which they are sub-obsolete) the circular areas arise on the second thoracic and eighth abdominal segments.

*Cocoon.* The cocoon formed by the larva just before pupation is white and very thick and felt-like. Very often frass and other debris are used in the construction of the cocoon. These cocoons are often found in numbers closely matted together in such a way that it is only with considerable difficulty that they can be separated.

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(3) DURRANT and BEVERIDGE. Journal Royal Army Medical Corps. Vol. 20, pp. 615—634.

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*April 6th,* 1935.

## A SUGGESTED EXPLANATION OF VARIATION IN CRYPTIC LEPIDOPTERA.

BY G. V. HUDSON, F.R.E.S., F.N.Z.INST.

In the course of my work on New Zealand Lepidoptera, I have often come across striking instances of great variation amongst those species which are specially protected from their enemies by a close resemblance to the surroundings (Protective Resemblance, or Cryptic Coloration), but, so far as I am aware, no attempt has so far been made to explain why Cryptic Coloration should be associated with great variability, especially amongst the commoner and more abundant species in which it so frequently occurs. This is particularly noticeable in the case of the Geometrina, the most interesting group of the Macro-Lepidoptera we have in New Zealand. In order to present the subject in an intelligible form, I propose first to give a few of the most striking instances of actual variation which have come under my notice, and then to state, as briefly as possible, the explanation which has suggested itself to me as the most probable.

In the beautiful genus *Chloroclystis* we have such extreme variation that the greatest difficulty has been experienced in fixing the limits of many of the species, and much still remains to be done before our knowledge of the genus can be regarded as in any way satisfactory. In all the species the general colour scheme is directed to the protection of the insects whilst resting with outspread wings on tree-trunks. In some there is a certain amount of approximation to the appearance of bird-droppings, and these often rest on leaves (*C. sphragitis, C. sandycias,* etc.). Large white blotches are commonly met with on the fore-wings of species, which are otherwise more or less green or brown in their general coloration, and these forms are strikingly suggestive of white lichens, or bird-droppings; such markings also tend to break up the real outline of the insect, and thus contribute towards its invisibility. In the extremely variable and abundant *Tortrix excessana* similar white blotches occasionally occur, and this form was at one time regarded as a distinct species under the name of *Tortrix biguttana.* Great variation exists in the very common *Hydriomena deltoidata,* but the very numerous species included under *Xanthorhoe* are not so variable. In *Epirrhanthis* the general coloration is that of dead leaves, and extreme variation is always in evidence. In the dark brown forms irregular blotches of yellow occur, and markings suggestive of patches of fungi, so often present on dead leaves, are met with in endless variety. Almost all the species comprised in the extensive genus *Selidosema* are subject to such great variation that here again there has been the utmost difficulty in comprehending the true species, and we are still far from a complete knowledge of these difficult forms. Several of the commonest species (*S. productata, S. dejectaria,* and *S. panagrata*) are at the same time the most variable. The interesting genera *Azelina* and *Gargaphia* include some of the most variable ' dead leaf ' forms we have, and in addition possess the extraordinary instinct of allowing themselves to fall through the air with outspread wings, when they exactly resemble a falling leaf. Even if the precise spot where they come to rest is located, the utmost difficulty is often experienced in finding the insect. Finally, in the genus *Declana,* we have in the abundant *D. floccosa* one of the most variable moths in New Zealand. The colour-scheme of the fore-wings, which alone are exposed when the insect is resting, closely approximate to grey lichen, but the light and dark markings exhibit endless variety both in form and in intensity; a whole drawer full of specimens is in fact needed before any adequate idea of the species can be grasped.

As an example of extreme variation outside the Lepidoptera, the very interesting little Neuropteron *Drepanacra binocula* may be mentioned. When resting, its resemblance to a dead or partly skeletonised leaf is almost perfect, but the object aimed at is attained by endless variation in the detailed pattern on the wings. In some forms the midrib of the ' leaf ' is distinctly indicated by a dark line from the base to the apex of the fore-wing, but in others there is no trace of this adaptation. This insect rests with its wings closed as a steep roof, and the shape of the fore-wings, which alone are displayed, give the leaf-like appearance to all the numerous forms of this remarkable insect. Needless to say, *D. binocula* has many synonyms.

It was during last October, whilst netting varieties of *Chloroclystis sandycias* on the coast hills near Sinclair Head, Cook Strait, that an idea occurred to me which I do not remember to have seen published. The conception of 'Common Warning Colours' is of course a very old one and forms the basis of the Mullerian theory of mimicry. It is, in fact, generally agreed that a conspicuous pattern and coloration, held more or less in common by a number of distasteful or obnoxious insects (and their mimics), protects the 'association' from destruction, in so far as birds and other predators soon learn *one* such pattern and avoid it. As a result, the insects comprised in such an 'association' are not subjected to the same amount of 'experimental tasting' as they would be if of *different* patterns, however conspicuous such varied patterns might be. Now the idea which has occurred to me is the observe of this. A cryptic resemblance, however perfect, if possessed by a common and highly edible species, would soon be recognised and learnt by predators, and although remaining to a certain extent effective, would tend to become less efficient as the knowledge of predators increased. On the other hand, if the disguise is varied in endless detail, the task of learning and locating the cryptic species is enormously increased, and in this way great benefit will accrue to all species which add to a cryptic appearance the additional attribute of great variability. It has often been assumed that a very variable species is an assemblage of incipient species in the making. Such an explanation is somewhat conjectural, the question immediately arising as to why the intermediate forms have not been eliminated in the same way as they have been in the constant species, often very closely allied to the variable ones. On the other hand, if variation is actively beneficial in baffling the insects' enemies, its prevalence in cryptic forms is quite comprehensible, and the fact that so many highly variable species are also very abundant seems to favour this view.

In conclusion, I desire to point out that the explanation here tentatively given has been reached through a study of a comparatively small section of the limited insect fauna of New Zealand, and it is now presented mainly with the object of stimulating other workers, who may be more fortunately placed, to test its general validity.

Hillview, Karori, W.3,
Wellington, New Zealand.
*April 17th, 1935.*

# ON SOME HEMIPTERA NEW TO BRITAIN.

BY W. E. CHINA, M.A.
(Entom. Dept., Brit. Mus., Natural History).

At the beginning of February of this year, I was able, thanks to the courtesy of Mr. E. C. Bedwell, to examine an interesting collection of Hemiptera made by Mr. P. Harwood. This collection contained, in addition to various rare forms, three species not previously recorded from Britain. With Mr. Harwood's kind permission, I therefore propose to bring these species to the notice of British collectors.

## Family LYGAEIDAE.

### *Acompus opacus* Priesner.

*Acompus opacus* was first distinguished from *A. rufipes* Wolff and described as a new species from Austria by Prof. H. Priesner in 1927 (Zeitschr. f. Wissensch. Insektenbiologie, xxii (xxxi), pp. 55-65). The following year it was recorded from France by Dr. H. Ribaut (Bull. Soc. Hist. Nat. Toulouse, lvii, pp. 170-174), who later gave additional characters by which the species could be recognised (op. cit., lviii, pp. 109-11, 1929). The distinguishing characters given by Ribaut are as follows :—

| *A. rufipes* Wolff. | *A. opacus* Priesner. |
|---|---|
| Scutellum scarcely longer than the claval commissure, for the greater part shining, only at base with a velvety band. | Scutellum twice as long as the claval commissure, entirely dull velvety. |
| Elytra very shiny, punctures large and sparse. Elytral membrane in brachypterous form rectilinear on the internal three-quarters of its posterior margin, its internal margin much shorter than the claval commissure. | Elytra less shining, with finer and more dense punctures. Elytral membrane in brachypterous form broadly rounded at posterior margin, internal margin as long as the claval commissure. |
| Head less wide, eyes less prominent, projecting less than one-seventh the total width of head beyond anterior lateral angles of pronotum. | Head wider, eyes more prominent, projecting one-fifth the total width of head beyond anterior lateral angles of pronotum. |
| Antennae shorter and more robust, the end segment dark brown. | Antennae longer and more slender, the end segment often concolorous, light fulvous. |
| Posterior margin of the last abdominal segment above, black in the ♂. | Posterior margin of last abdominal segment above, tinted with yellow in the ♂. |
| Femora, at least the intermediate and posterior pairs, light fulvous. | Femora dark brown for almost their entire length except in var. *laetipes* Ribaut, in which they are light fulvous. |
| Species living in moist places. | Species living in dry places. |

*A. opacus* is now known to occur in Germany and Holland.

The British example was taken at Colchester, Essex. Mr. Harwood writes : 'It was taken a good many years ago, probably by my late father, or possibly by my brother; it is also possible I took it myself. I am fairly certain it was prior to 1900.'

### *Peritrechus angusticollis* Sahlb.

*Beosus angusticollis* Sahlberg R.F., Monog. Geocoris. Fenn., 1848, p. 66.

This species most resembles *P. geniculatus* Hahn. but is readily distinguished by its smaller size, narrower form, more incrassate antennae, narrower head, and femora fulvous at base instead of entirely black. Saunders' key to the British species of *Peritrechus* can be modified as follows :—

(2) 1 Front femora with one obscure spine, membrane with a distinct white apical spot. Length 4—4.7 mm. ... *P. sylvestris* F. (*luniger* Saund.).
(1) 2 Front femora with two more or less distinct spines; membrane without an apical spot.
(4) 3 Femora fulvous on basal half; antennae incrassate. Length 3.6—4 mm. ........... *P. angusticollis* Sahlb.
(3) 4 Femora entirely black.
(6) 5 Hind tibiae entirely pale except for small dark mark at base of middle and hind pair; antennae long and slender. Length 5—6 mm. ........... *P. gracilicornis* Put.
(5) 6 Hind tibiae entirely black, slightly paler at apex; antennae shorter and less slender.
(8) 7 Pronotum transverse; antennae slender; elytra and membrane distinctly mottled. Length 5—5.2 mm. ........................... *P. nubilus* Fall.
(7) 8 Pronotum less transverse, more than half as long as wide at base; antennae slightly thickened, but not so much so as in *angusticollis*. Length 5—5.6 mm. ................................ *P. geniculatus* Hahn.

*Peritrechus angusticollis* Sahlb. occurs in Sweden, Germany, France, Finland, N. Russia, Caucasus Siberia.

The British example was taken by Mr. P. Harwood at Studland, Dorset, on September 8th, 1934.

### *Drymus pumilio* Put.

Puton, Ann. Soc. Ent. France (5), vii, Bull. des Séances, p. xxxv, 1877. Synopsis Hemipt. Heteropt. de France I, Pt. 1, p. 71, 1878.

Something like a small dark male of *D. sylvaticus* F. but relatively broad across middle of elytra, and with legs entirely brown. According to Puton this species differs from all others of the genus by its small size, 2·5—3 mm. Some males of *D. pilicornis*, however, are not more than 3 mm. long but they differ from *pumilio* in the more elongate form, shining pronotum and pilose tibiae.

Saunders' key to the British species of *Drymus* may be modified to include *D. latus* D. & S. (=*D. confusus* Horv., not *D. pilicornis* M. & R. as stated by Oshanin) and *D. pumilio* Put.

(12) 1 Pronotum dull or, if shining anteriorly, distinctly punctate.
(7) 2 Tibiae with long projecting hairs.
(4) 3 Abdomen beneath dull, closely punctured, pubescence dense. ............ *D. pilipes* Fieb.
(3) 4 Abdomen beneath shining, unpunctured, or with fine wrinkles, pubescence scattered.
(6) 5 Larger, 4.5—5.5 mm. Anterior femora with one large and two or three minute teeth. Anterior tibiae of ♂ nearly straight. ............ *D. latus* D. & S (*D. confusus* Horv.).
(5) 6 Smaller, 3—3.5 mm. Anterior femora with one large and five or six minute teeth. Anterior tibiae of ♂ much curved, gradually dilated inwardly at apex .................................... *D. pilicornis* M. & R.
(2) 7 Tibiae without projecting hairs.
(11) 8 Posterior lobe of pronotum distinctly wider than anterior lobe; lateral margins of pronotum feebly concavely sinuate.
(10) 9 Length 2.5—3 mm.; legs entirely brown .................. *D. pumilio* Put.
(9) 10 Length 3.7—5 mm.; femora and tibiae black ........... *D. sylvaticus* F.
(8) 11 Posterior lobe of pronotum very little wider than anterior lobe; lateral margins of pronotum strongly concavely sinuate. ............ *D. brunneus* Sahlb.
(1) 12 Pronotum shining anteriorly, impunctate or nearly so .. *D. piceus* Flör.

## NEW COUNTY RECORDS.

In addition to the above new species, Mr. Harwood has taken the following rare and interesting species, the occurrence of which is worth recording.

*Lygus atomarius* Mey. (Capsidae).

Numerous specimens on Douglas Fir near Wimborne, Dorset, 16.ii.1935, in company with *Cardiastethus fasciiventris* Garb. and two specimens in the New Forest, Hants, date not stated.

This species has been recorded hitherto only from Norfolk, Suffolk and Ireland (Dublin Co., Wicklow Co.).

*Acalypta platychila* Fieb. (Tingitidae).

Several specimens at West Parley, Dorset, on 20.vi.1930.

Previously only known from Suffolk, where it was collected by Mr. Harwood at Brandon, 25.v.1912, and at Mildenhall, 13.v.1931.

*Acalypta nigrina* Fall. (Tingitidae).

One specimen at Rannoch, Perthshire, vii.1921.

Previously only known from Somerset, Oxfordshire, Morayshire and Inverness (Aviemore).

British Museum (Natural History),
Cromwell Road, London, S.W.7.
*May 31st, 1935.*

# (I) TWO FURTHER RECORDS OF THE ASSOCIATION OF HIPPOBOSCIDAE AND MALLOPHAGA.

# (II) AN ANTHOCORID BUG FEEDING ON *DERMANYSSUS GALLINAE* (REDI).

BY GORDON B. THOMPSON
(Department of Entomology, British Museum (Nat. Hist.)).

## I.

*For the material on which the two following records are based* I am indebted to Dr. Jos. Bequaert, of the Harvard University Medical School, Boston, Mass., U.S.A.

(1) A *Philopterus* attached to the abdomen of a *Lynchia* taken off *Pyromelana orix nigrifrons* Böhm., Belgian Congo, Kamaniola (2° 45′ S., 29° E.; in the valley of the Ruzizi River) (*J. Bequaert coll.*). Dr. Bequaert tells me that the *Lynchia* on which he found the louse represents a species new to science and that he will shortly be describing it. The record is of particular interest as it appears to be the first time that a Hippoboscid has been found with a louse attached to it in Africa.

(2) A *Degeeriella marginalis* (Burmeister) attached to one side of the abdomen of *Ornithomyia chloropus* Bergr., taken off *Turdus pilaris* Linn. (Fieldfare), Sweden, Karlshamn, 29.vi.1905 (*A. G. Hammar coll.*).

During the past year I have examined roughly one hundred and fifty Hippoboscidae of various species, from the British Isles and Uganda, and in each case I have known the name of the hosts upon which the Hippoboscidae were taken and also whether any lice were taken on the hosts. I did not find a single case of such an association as this. Judging from these figures, it is evident that the extent to which Mallophaga become attached to Hippoboscidae is extremely small.

## II.

In connection with the investigations into the ectoparasites of the Swallow (*Hirundo r. rustica* Linn.) under the auspices of the British Ornithological Trust, I received the linings of nine nests of Swallows during September, 1934. In every case the nests were swarming with examples of all stages of the common 'fowl mite,' *Dermanyssus gallinae* (Redi), the determination of which has been kindly checked for me by Dr. Finnegan. The nests were from the following localities:—Sussex, nr. Hastings, Fairlight, ix.1934 (*P. A. D. Hollom*); Suffolk, Woodbridge, ix.1934 (*A. Mayall*); Kent, Tenterden, ix.1934 (*H. F. Ticehurst*).

One of the nest linings from Fairlight contained a female example of the Anthocorid bug, *Triphleps majusculus* Reut. (W. E. China det.). This bug was kept under observation together with the nest material and a very large number of mites, and I noticed that it continually attacked the mites. It pierced the dorsum of the abdomen of every mite that it encountered on the occasions when I was watching it and after a very short time withdrew its rostrum, leaving an empty exoskeleton. Having observed this on several occasions, I moved it to a large corked tube containing a piece of blotting paper. Every day for nearly two weeks a dozen mites were given to the bug and it fed voraciously on them. After this the bug died.

China (1933) * has suggested that some of the Anthocoridae probably feed on mites (Acarina), and the above observation certainly supports this suggestion. There were no visible forms of life in the nest other than the mites.

British Museum (Natural History),
Cromwell Road, London, S.W.7.
*March*, 1935.

*Synharmonia* (*Coccinella*) *conglobata* L. *and Propylea* 14-*punctata* L.—The name commonly appearing in lists of British beetles as *Halyzia congoblata* L. should be deleted and *Propylea* 14-*punctata* L. substituted. According to Dr. K. G. Blair, of the British Museum (Natural History), the true *C. conglobata* L. has not been recorded as having occurred in the British Isles. Cox and Joy both refer to our insect as *C.* 14-*punctata*, and omit *conglobata*; but Sir T. H. Beare, in his 'Catalogue of the Coleoptera of the British Isles,' 1930, calls it *Synharmonia conglobata*, omitting the name 14-*punctata*, while Fowler gives 14-*punctata* L. as a synonym of *Halyzia conglobata* L. The confusion is of long standing, and, though Continental authorities have long since corrected it, British authors seem to have been slow to do so. Incidentally it may be noted that modern authors—Ganglbauer, Reitter, Korschefsky, Mader, Winkler, etc. —spell the names *Propylaea*, whereas Mulsant wrote *Propylea*.—R. M. WEST (Lieut.-Colonel), F.R.E.S., Brooklyn, Wootton Bridge, I.W.: *March 26th*, 1935.

*Corixa dentipes Th. in Westmorland.*—A visit to a small tarn in the Appleby district of Westmorland on the 19th instant, in search of Corixids, was not so productive of that variety of forms as on a former visit seven years previously, when eight different species were taken. The predominant species on the present occasion was *Callicorixa praeusta* Fieb., *Arctocorisa germari* Fieb. being a poor second. Chief interest, however, centred in *Corixa dentipes* Th., of which one of each sex occurred, this being a new record for Westmorland. Its near ally, *C. geoffroyi* Leach, was also present, but equally scarce, two males only being taken. In Cumberland the two species occur in association in at least two localities; in a third locality where *dentipes* is found *geoffroyi* appears to be absent; the latter, of course, occurs in many ponds unaccompanied by *dentipes*. —F. H. DAY, Carlisle: *May 23rd*, 1935.

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* Ann. Mag Nat. Hist., Ser. 10, Vol. XI, p. 518.

*Dumfriesshire Hemiptera-Heteroptera in 1934.*—A notable feature of the year 1934 in this district was the unusual abundance of Pentatomidae, which quite confounded my previous experience with this family here. On 31.viii I found a party of five *Piezodorus lituratus* Fab. on bramble, but only one was mature. *Picromerus bidens* L. was abundant on heather during August. *Elasmostethus interstinctus* L. and *Elasmucha grisea* L. occurred on birch in greater numbers than I have ever seen before. Twenty or thirty specimens could easily have been taken in an afternoon's collecting in September. During this spring (1935) their desiccated and often limbless bodies were beaten from Scotch Firs. *Zicrona coerulea* L., one beaten from heather, 7.viii, on Newton Moss, the first I have met with in ten years. *Rhacognathus punctatus* L., four specimens beaten from heather on Newton Moss between 23.viii and 3.ix. *Drymus brunneus* Sahlb., local and not very common by sweeping and in moss in spring. *Scolopostethus thomsoni* Reut. is common on nettles. I have taken this species in every month excepting December and January. *Acalypta parvula* Fall., uncommon, in moss and by sweeping rough herbage. *Nabis rugosus* L., abundant on heather. *N. flavomarginatus* Scholtz. is also common. *Cryptostemma alienum* H.-S., in flood refuse at the mouth of the R. Kirtle in June. *Phytocoris longipennis* Flor is plentiful at Nutberry on oak trees in August. *Calocoris sexguttatus* Fab., only locally common, frequenting nettles. *Lygus kalmi* L., common on umbels. *Rhopalotomus ater* L., common in damp situations in July, and a form with red pronotum is occasionally met with. *Bothynotus pilosus* Boh., three specimens, all ♂♂, were beaten from some birches on Newton Moss, 17.vii, quite away from any firs. *Harpocera thoracica* Fall., at Nutberry on oaks, and by sweeping on Newton Moss in early summer. *Psallus betuleti* Fall., not rare on birch in June. *P. roseus* Fab. is locally abundant. *Salda littoralis* L., common on river banks in summer. It takes wing readily on sunny days and is then difficult to capture unless a net is used. *Acanthia saltatoria* L., not uncommon; occurs on our peat mosses as well as along river banks. *A. orthochila* Fieb., rather rare; my specimens are from moss. *A. c-album* Fieb. I have only met with odd examples on river banks. Lack of suitable ponds makes my list of aquatic forms a meagre one, but in the holes left by the peat-cutters I have taken *Arctocorisa sahlbergi* Fieb., *A. limitata* Fieb., *A. fabricii* Fieb., and *Callicorixa praeusta* Fieb. From a pool near the R. Kirtle I have *A. fabricii* Fieb. and *A. limitata* Fieb.—JAS. MURRAY, 6 Burnside Road, Gretna : *May 22nd*, 1935.

## THE BRITISH TULLBERGIINAE. PT. I.

(FIGS. 1—11.)

BY RICHARD S. BAGNALL, D.SC., F.R.S.E.

When I first devoted my attention to the Collembola more than twenty-five years ago no species of this group was known from the British Isles, but I quickly discovered several, of which I was able to identify *Tullbergia iapygiformis*, the true *quadrispina*, *affinis*, *callipygos* and *krausbaueri*. Meanwhile *krausbaueri* and *quadrispina* were recognised and brought forward as British by other workers, whilst Womersley published all these names in 1929 in his keys to the British Collembola in circumstances I have already mentioned, though when he brought forward his own record of *affinis* in another paper (Ent. Mo. Mag., 1930, LXVI, p. 37), he stated that 'apart from it being contained in a manuscript list of British Collembola by Mr. R. S. Bagnall I know of no previous record from this country.' In the same year (1930) Womersley diagnosed his *Paratullbergia concolor*, whilst early in 1934 Davies brought forward *T. bipartita* Handschin as British. Thus there are published records of *P. concolor, T. quadrispina, krausbaueri, affinis* and *bipartita,* whilst *iapygiformis* and *callipygos* appear as names only in Womersley's key.

These little creatures have always appealed to me, although I have paid but little attention to them for many years. In the spring of 1934 I began to collect these and other small fry (*Protura* and *Pauropods*) intensively and with considerable success. I have not, however, had the opportunity of working on the richer soils, so that whilst I have met with many further species new to the British fauna, I have not as yet re-taken *quadrispina, affinis, iapygiformis* and *callipygos,* so that, whilst my researches have justified a revision of the classification (which I have published elsewhere) and this review of the British genera and species, my contribution is necessarily weak in respect to such species. In the following pages I have characterised the subfamily and its known Palaearctic genera and have dealt with the following species, of which those marked with an asterisk are recorded as British for the first time: —*Paratullbergia concolor* Wom., **P. carpenteri* sp.n., **P. womersleyi* sp.n., **Neonaphorura duboscqi* (Den.), **Stenaphorura iapygiformis* Abs., *S. quadrispina* Börn., **S. axelsoni* sp.n., **S. denisi* sp.n. and **S. lubbocki* sp.n. The species of the genera *Neotullbergia* and *Mesaphorura* will be dealt with in the second part of this contribution. In diagnosing new species I have been particularly pleased to dedicate most of them to prominent entomologists — for the most part students of Collembola — whose names and work are too well known to be referred to separately.

In the field these minute creatures may be distinguished from the smaller members of Onychiurinae by their narrower form and sinuous movements; unlike species of *Onychiurus* they do not roll up when disturbed, and if touched with a hair they slowly turn to right or left and walk on. From the writer's experience in this country it is obvious that wide collecting will add considerably to our knowledge of the species and their distribution. They are to be found under stones (lightly to deeply embedded) in gardens, fields and woods or by the sides of rivers and streams, in the beds of dried-up ponds and streams, on mountains or on coastal cliffs. They also occur in frass under the bark of trees, whilst some species have been found amongst the decaying grass under somewhat recently fallen or overturned stones and under logs lying on coastal sand-banks, as well as amongst débris lying at or just below high-water mark.

I have seen them in such plenty that several hundred specimens could be collected in less than two hours.

### Family ONYCHIURIDAE.

### Subfam. TULLBERGIINAE Bagn. 1935.

The species of the subfamily may be characterised by their slender form, their small size (0·45—1·5 mm. with the single exception of *T. antarctica* Lubb., which is 3·0—4·0 mm. in length) and more particularly by the structure of the sense-organ of Ant. III and *by the fact that in no position is there more than* 1 + 1 *pseudocelli,* which may be present on any or all the body segments Th. i—iii and Abd. I—V in addition to the hind-margin of the head and in front of the PAO — a possible maximum of 20 (10 + 10) in all. The AH number (0) 2 — 6 (9) and the PAO fall into several types. If the empodium of the foot be present it is minutely spiniform or setiform.

Until 1930, when Womersley diagnosed the genus *Paratullbergia,* all species had been referred to the genus *Tullbergia* following Börner's classification of 1902. Recently I have been forced to revise this classification and to limit and reinstate the genera *Stenaphorura* Abs. and *Mesaphorura* Börn., which had been sunk as synonyms of *Tullbergia* by Börner in 1902, as well as to characterise three new genera. In my classification I diagnose four strongly characterised groups: two of these, for the Antarctic genera *Tullbergia* s.str. and *Dinaphorura* Bagn., do not concern us. All the genera of the remaining two groups are represented in our fauna and may be tabulated as follows:—

### KEY TO THE BRITISH GROUPS AND GENERA.

1. Sense-organ of Ant. III consisting of two superior sense-rods *which are strongly curved, sub-reniform, and which curve towards each other,* with sometimes a similar accessory sense-rod; *these are partially covered by a cuticular ridge or fold and/or by true papillae* (fig. 8). The two inferior sense-rods may be straight, curved or clavate and are *partly or wholly concealed behind the cuticular ridge or papillae.* Ant. IV with a single apical sense-knob ... ........................................................... Group II, 2

Sense-organ of Ant. III *apparently without sense-rods and composed of two large papillae,* each in separate but adjacent cavity and bent towards each other, the two pockets lying within a deep fold of the outer antennal wall (fig. 3). *Apex of Ant. IV without apical sense-knob.* Species British.
............ Group I. Genus PARATULLBERGIA Wom.

2. Species having one pair (two) of AH, which may be simple or branched. PAO with simple or complex vesicles; if simple the vesicles are usually fusiform *and lie at less than a right-angle to the axis* .................................. 4
Species having at least two pairs (four) of simple AH. Species European ... 3

3. Anal segment with a basal pair of spine-like papillae in addition to four well-chitinised AH, making six processes in all (fig. 4). PAO broad, *comprising only twelve triangulate unilocular vesicles* (fig. 5). ............ Genus Neonaphorura Bagn.
Anal segment with only four AH. PAO with at least twenty-five vesicles, which are never triangulate; if simple, elongate or fusiform *the vesicles lie at right-angles to the axis* .......... Genus Stenaphorura (Abs.) Bagn.

4. AH each furnished with two smaller branches. PAO either simple or complex. Species European ................................ Genus Neotullbergia Bagn.
Anal segment with or without a small medio-ventral process in addition to the simple AH. PAO either simple or complex. Species widely distributed ...................................... Genus Mesaphorura (Born) Bagn.

# THE BRITISH GENERA AND SPECIES.

## GROUP I.

### Genus Paratullbergia Wom. 1930.

Womersley, 1930, Ann. Mag. Nat. Hist. (10), vi, p. 149, figs.; Bagnall, 1935, Ann. Mag. Nat. Hist. (10), xv, p. 242, figs. 4-8.

This genus was erected by Womersley in 1930 for his *P. concolor*, and two further species are now described.

It is an interesting fact that all three species have been found in Epping Forest near Loughton. On November 11th, 1934, I visited Loughton in the hopes of collecting further examples of *P. concolor*; I was unsuccessful in my quest but found examples of *P. carpenteri* (which is very widely distributed) and a new species, *P. womersleyi*.

### Key to the Species.

1. Colour uniform light brown. Ant. IV with two doubly-bent (*i.e.* long-drawn-out S-form), blunt distal sensory rods; PAO long, straight and exceptionally narrow, with sixty—eighty minute vesicles in two rows of thirty—forty each. AH strong and curved .................................. *P. concolor* Wom.
Colour white to dirty-white. Ant. IV either with or without sensory rods. PAO broader and consisting of two rows of apparently double-headed vesicles. AH stouter and more strongly curved ................................ 2

2. Size 0.92—1.2. *Ant. IV with several curved, blunt sensory rods* (as in *Stenaphorura*), of which three are situated distally and strongly curved over the apex. PAO longer, composed of two rows of twenty-six—thirty double-headed vesicles each (fig. 2). AH comparatively larger, 1.25 times as long as the foot ........................................................ *P. carpenteri* sp.n.
Size 0.65. *Ant. IV without sensory rods.* PAO shorter, composed of two rows of eighteen—twenty similar vesicles each AH as long as foot. ............ *P. womersleyi* sp.n.

### (1) *Paratullbergia concolor* Womersley.

1930, Ann. Mag. Nat. Hist. (10), vi, p. 151, figs. 4-10.

ESSEX. Described from a single example found under loose bark of a rotten log in Epping Forest near Loughton, 26.iii.30.

The structure of the sense organ of Ant. III and of the pso. (figs. 3-3A) are sufficient to justify the genus, and these characters are exhibited in *P. carpenteri* and *P. womersleyi*, in which species, however, other characters relied upon by Womersley as generic—that is, the presence of only two doubly bent blunt sensory bristles on Ant. IV and the peculiarly long and narrow PAO—do not hold true; on the other hand, the absence of a sensory-knob at the apex of Ant. IV may prove to have generic value.

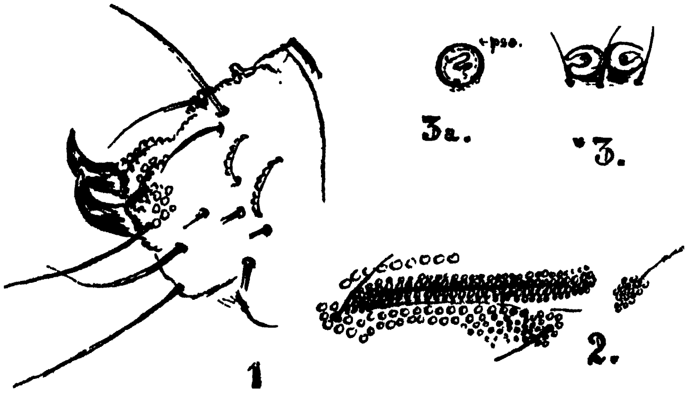
### (2) **Paratullbergia carpenteri** sp. n.

Length 0.92—1.2 mm.

Colour white to dirty-grey, the ectodermal pigmentation usually thickest on the antennae and limbs; AH tawny yellow. Form and structure generally as in *P. concolor*.

Ant. IV c. 1.5 times as long as broad, with several curved, blunt sensory rods (as in *Stenaphorura*), of which at least three are distal and strongly curved over the apex; apical sensory knob absent and apparently replaced by a sensory pit, but I have not been able to make this out satisfactorily from the material available. Sense-organ of Ant. III as in *P. concolor*.

PAO somewhat elongated, about as long as the antennal breadth, slightly curved at ends, much broader than in *concolor* and apparently composed of two rows of twenty-six—thirty double-headed vesicles (fig. 2).



FIGS. 1—3. *Paratullbergia carpenteri* sp.n. (1) Last abdominal segment; (2) postantennal organ; (3) outline of sense organ of antennal joint III; (3*a*) pseudocellus.

Pseudocelli (as described for *concolor*) situated as follows: 1+1 in front of the PAO and 1+1 on Th. ii—iii and Abd I, IV and V, making twelve in all and differing from *concolor* in the possession of the two thoracic pairs.

AH stouter than in *concolor*, c. 1.25 times as [illegible]g as foot, strongly cu[illegible] and situated on large papillae, which meet basally, w[illegible] there is a[illegible] of rugoseness, in addition to which Abd VI is also furnished [illegible] low, rounded tubercular swellings and in most specimens a pair of tooth-like dorsal projections near base may be distinguished (fig. 1). Surface strongly granulate; bristles long and strong.

Old records. Occasional captures from Northumberland, Durham, Lancashire, Yorkshire, Devonshire, Somersetshire, Kent and Sussex.

Recent records. SUSSEX, Brighton, 1 example under stone on downs, v.34; ESSEX, Epping Forest, under logs near Loughton, 11.xi.34; LONDON, Chiswick, several examples in a garden, iv.34 (type and paratypes); E. YORKS, Ravenscar cliff, ix.34; SCOTLAND, Dalmeny shore and Gleneagles, single examples, viii.34; near Callendar, several under stones deeply embedded in the sandy soil of the banks of the Leny, 25.viii.34, and Lothianburn (Pentlands), near Edinburgh, xi.34; S. WALES, Penarth, 1 example under stone, xi.34.

### (3) **Paratullbergia womersleyi** sp. n.

Length c. 0.65 mm. Colour white. Ant. IV about as long as broad *and entirely devoid of sensory rods.* PAO of the same type as in *P. carpenteri*, but shorter than the antennal breadth and composed of two rows of eighteen—twenty apparently double-headed vesicles each. Last abdominal segment short, without low lateral rounded swellings but possessing a pair of tooth-like dorsal projections near base; AH stout, curved, not longer than foot and situated on low tubercles which are possibly not contiguous at base.

I am unable to give details of the pso, but I hope to secure further material in the near future.

ESSEX. Epping Forest, near Loughton, from under log embedded in earth, 11.xi.34. I discovered a small colony but unfortunately the contents of the tube were lost through breakage and I only salved a single example.

## GROUP II.

The genera *Neonaphorura* and *Stenaphorura* are dealt with herein, but, as already stated, *Neotullbergia* and *Mesaphorura* (which contains a number of minute and critical species) will be dealt with in a later part.

### Genus NEONAPHORURA Bagn.

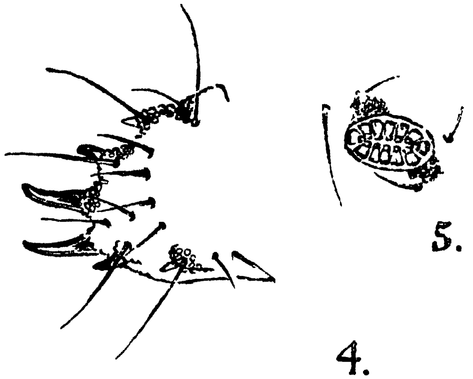
Bagnall, 1935, Ann. Mag. Nat. Hist. (10), XV, p. 240.

Distinguished at once by the three pairs of AH and the very distinctive type of PAO. Only one species is known.

### (4) *Neonaphorura duboscqi* (Den.).

*Tullbergia duboscqi* Denis, 1932, Arch. Zool. Exp. et gen., 74, 6. 366, fig. IV, 1—10; *Neonaphorura duboscqi* Bagnall, 1935, *l.c.* (10), XI, p. 241.

A small species, o·6 mm. in length, and strongly characterised by the possession of 6 AH, the basal part of which are feeble and might more properly be termed papillae (f. 4). The sense-organ of Ant. III includes 3 curved sensory rods and is guarded by 3 papillae and 4 guard setae. The PAO is short and broad (f. 5) and is apparently composed of 12 unilocular triangulate vesicles, though under certain lighting conditions some of these have the appearance of consisting of 3 separate vesicles as described by Denis.



FIGS. 4—5. *Neonaphorura duboscqi* (Denis). (4) Last abdominal segment, showing anal horns; (5) postantennal organ.

The species is well figured by Denis, and is described from a single Mediterranean example found at Banyuls (Pyr. Or.).

E. YORKS. Sewerby, 2 examples found under a stone, v.34; close search has not been successful in bringing further material to light.

### Genus STENAPHORURA Abs.

*Stenaphorura* Absolon, 1900, Zool. Anz., XXIII, No. 620, p. 411, figs. 9—12; *Tullbergia* Börner, 1902, Zool. Anz., XXVI, No. 689, p. 123. *Stenaphorura* Bagnall, 1935, Ann. Mag. Nat. Hist. (10), XV, p. 241, figs. 2—3.

There appears to be some confusion as to the identity of *T. quadrispina* Börner, and in the following table I have accepted Börner's very clear diagnosis and have given the name *axelsoni* to the '? *T. quadrispina*' of Axelson. Unfortunately I have not been able to secure fresh material of the true *quadrispina* and very little of *axelsoni*, and I must defer dealing more fully with these species (together with a third and more minute form) pending the acquirement of further material. I am also as yet unable to state whether Stach's *quadrispina* is referable to *axelsoni*.

The genus comprises those species in which there are two pairs of AH, and so far as we yet know is limited to Europe.

### Table of Species.

1. Sense organ of Ant. III with two superior sense rods protected only by a cuticular fold. PAO of regular form with elongated or fusiform vesicles set at right-angles to the axis ........ 2
Sense organs of Ant. 3 with usually three superior sense rods protected by papilla and dentate cuticular ridge (fig. 8). PAO otherwise (figs. 9 and 11) 3
2. Species smaller (0.85—1.0 mm.); PAO much shorter, with c. 25 fusiform, well separated vesicles ........ *S. quadrispina* Börn.
Species larger (1.2—1.3 mm.); PAO very long, with eighty to a hundred elongated vesicles ........ *S. iapygiformis* Abs.
3. PAO of normal form, with thirty-five—fifty small vesicles set at right-angles to the axis ........ *S. axelsoni* sp.n.
PAO otherwise ........ 4
4. *Ant. IV with a bare dome-formed area at end* (f. 7). PAO shorter, swollen in the first third, complex (f. 9). Anal segment longer, *with a pair of low tubercular swellings basally;* inferior AH shorter c. 0.45—0.5 the length of the superior (f. 6) ........ *S. denisi* sp.n.
Ant. IV normal. PAO long, mildly angulate and swollen at about 0.3 from each end, the swellings being apparently caused by the interpolation of additional vesicles (f. 11). Anal segment shorter, *without basal tubercles;* the inferior AH longer, c. 0.7 the length of the superior .. *S. lubbocki* sp.n.

### (5) *Stenaphorura iapygiformis* Abs.

*Stenaphorura iapygiformis* Absolon, 1900, Zool. Anz., XXIII, No. 620, p. 412, figs. 9—12; *Tullbergia iapygiformis* Börner, XXVI, No. 689, p. 412; *Stenaphorura iapygiformis* Bagnall, 1935, Ann. Mag. Nat. Hist. (10), XV, p. 241, figs. 2—3 (after Absolon).

Length 1·2—1·3 mm. Larger than *quadrispina* and possessing the same type of Ant. Organ III, but differing markedly from others in the group in its long straight PAO, which is comparatively broad, of regular form, and furnished with 80—100 narrow, closely set, elongated vesicles set at right-angles to the axis (see figures cited above).

Old records. Durham, in a quarry on the Wear near Hylton, a few examples measuring 1·3 mm. in length, 1910. Sussex, 1 example in an underground chamber, Hastings Castle, 1918.

### (6) *Stenaphorura quadrispina* Börn.

*Stenaphorura quadrispina* Börner, 1901, Zool. Anz., XXIV, Nos. 657—658, p. 699, fig. 3—4; *Tullbergia quadrispina* Börner, 1902, *l.c.*, XXVI, No. 689, p. 123; Collinge, 1910, Birmingham Not. Hist. & Phil. Soc., Fauna of the Midland Plateau, Thysanura and Collembola, p. 8, figs. 1 and 2 (after Börner).

Length 0·85—1·0 mm. PAO elliptical, c 3·0 times as long as broad and furnished with c 25 easily distinguishable, well-separated simple fusiform vesicles set at right-angles to the axis.

Probably widely distributed but rarer than *S. axelsoni*.

### (7) **Stenaphorura axelsoni** sp. n.

'? *Tullbergia quadrispina*' Axelson, 1912, Die Apterygotenfauna Finlands II, p. 96, pl. VIII, figs. 12—13.

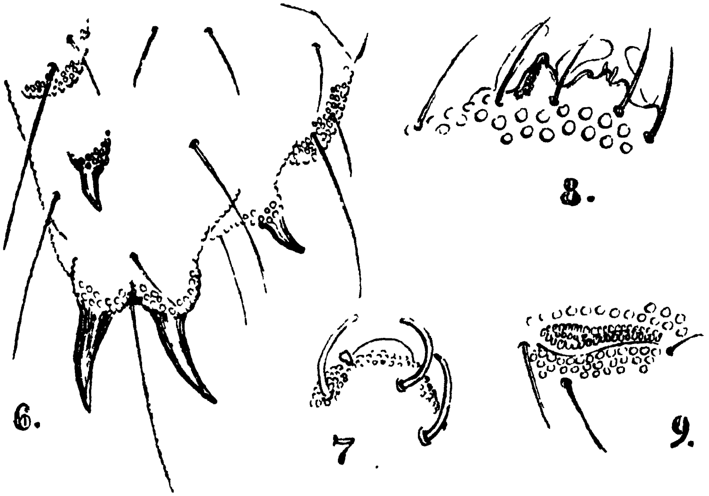
This would appear to be a not uncommon Northern form that has hitherto been confused with *S. quadrispina*.

1.0—1.1 mm. in length and having the PAO of regular form with thirty-five to fifty smaller vesicles lying at right-angles to the axis. Fully described by Axelson.

Apparently widely distributed in the North. My recent examples are from Perthshire, Lothian and Yorkshire.

### (8) **Stenaphorura denisi** sp. n.

Length 1.2 to 1.3 mm. Colour white, with the superior AH horn-coloured and the inferior pair usually paler. Cuticle coarsely granular.



FIGS. 6—9. *Stenaphorura denisi* sp.n. (6) Last abdominal segment, showing anal horns; (7) end of antennal segment IV, showing dome-like swelling; (8) sense organ of third antennal segment; (9) left postantennal organ.

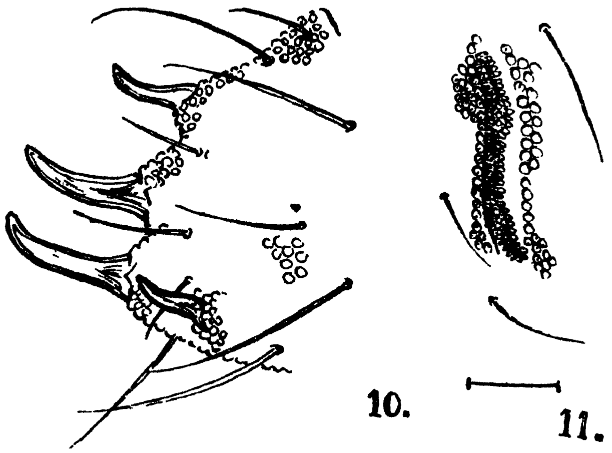
Sensory organ of Ant. III with three superior sense rods, partially protected by a conical papilla followed by a tridentate cuticular ridge (fig. 8); apex of Ant. IV surmounted by a bare, more or less broad dome-like swelling in addition to the apical knob (fig. 7). PAO complex, shorter than the antennal breadth at joint III; axis faintly sinuous, and broadening in the outer third, apparently because of the intercallation of three or four additional vesicles (fig. 9). Foot without empodium 0.7 (or thereabouts) the length of the superior AH.

Last abdominal segment comparatively long and furnished with a basal pair of low dorsal swellings in addition to the AH; superior AH long, lightly curved and situated on pronounced tubercles which are contiguous basally; inferior pair also situated on tubercles and comparatively short, not exceeding 0.45—0.5 the length of the superior pair (fig. 6).

Probably widely distributed throughout the country; recent records from Perthshire, Lothian, Northumberland, Durham, Yorkshire, Middlesex, Surrey, Kent, Sussex, Bedfordshire, and Glamorgan.

### (9) **Stenaphorura lubbocki** sp. n.

Length 1.0—1.15 mm. Very like *denisi*, from which it may be distinguished as follows:—



Figs. 10—11. *Stenaphorura lubbocki* sp.n. (10) Last abdominal segment; (11) Postantennal organ.

1. Ant. IV without apical dome-like swelling.
2. PAO more elongated, longer than the breadth of Ant. III and composed of about eighty simple vesicles in two rows, which at approximately 0.3 from either end are slightly angulate, apparently due to two or three additional tubercles between them (fig. 11).
3. The foot appears to be furnished with a vestigial empodium much as figured by Folsom for *Mesaphorura* (*Tullbergia*) *collis* Bacon.
4. The last abdominal segment is short and without basal tubercular swellings, whilst the inferior AH more closely approach the superior in colour, form and size than in *denisi*, being 0.7 their length (fig. 10).

The genital opening is eye-shaped, with two minute median setae, and protected anteriorly by a series of larger setae as figured for *M.* (*T.*) *collis mexicana* Handschin, except that the lower pair figured by Handschin is in this species represented by three setae; postero-laterally there is a pair of still stronger setae, as in *mexicana*.

Rare. PERTHSHIRE, Gleneagles, and E. YORKS, Danes Dyke near Flamborough, in each case one example only, viii,34.

Edinburgh.

*January*, 1935.

## *PHILONTHUS RECTANGULUS* SHARP IN BRITAIN.

### BY THE REV. C. E. TOTTENHAM, M.A., F.R.E.S.

A shining black species with a very slight iridescence on the abdomen, and with a distinct bronze tint to the elytra, which is similar to that of *politus* L. but not so evident. The antennae are dark brown and rather variable in colour. According to Gridelli (Boll. Soc. Ent. Ital. 1927, pp. 118-124), the three basal joints are black-brown, but in many of my specimens they are a little lighter than the rest of the antennae. The palpi are for the most part distinctly lighter than the antennae. The legs are yellow-brown, very infuscate on the tibiae, especially the posterior pair.

The head varies considerably in size, and is much larger in the male than in the female. It is transverse in both sexes, parallel-sided and with strongly marked posterior angles which are square but rounded off; in fact the shape of the head is a rectangle. The eyes are large, the outer margin forms almost a continuous straight line with the side of the head, the length of the eye being about one-half of that of the side of the head. There is a large, distinct impression on the front of the head, triangular in shape, the base of the triangle extending between the points of insertion of the antennae, and the vertex extending backwards to between the interocular punctures. There is a large puncture close to the inner margin of each eye, placed at about two-fifths of its length measuring from the front. Almost in a straight line between these punctures are two other large punctures, one on each side of the head, each being situate half way between the ocular puncture and the middle of the head. There is another large puncture on each side almost level with the posterior margin of the eye, forming the vertex of an isosceles triangle with the two anterior punctures on each side, the sides of this triangle being about double the base. Between the eye and the base of the head there are four or five other large punctures on each side. In addition there are numerous small punctures near the base of the eyes and in the posterior angles of the head. It must be remembered that these punctures are not constant, especially in the basal group, either in position or size. The antennae are slender and not thickened, the second and third segments equal to one another and about twice as long as broad; fourth segment slightly longer than broad, the rest quadrate, except the apical which is longer than broad and narrowed to a point internally.

The thorax is quadrate, about as long as broad, with sides parallel, scarcely narrowed towards apex, with angles rounded, and with base strongly and evenly rounded. The dorsal series consists of five very strong punctures, the three intermediate punctures of the series being very close together, the anterior puncture a little further apart, and the posterior puncture of the five still more remote from the fourth. As is often the case in the genus, there is a certain amount of variability in these punctures, either one puncture being missing or there being an extra puncture, but in all the examples I have seen there is this characteristic arrangement of large punctures at any rate in one of the two series. Between the dorsal series and the lateral margin of the thorax are two other large punctures placed parallel with the dorsal series on each side, and also several much smaller punctures placed near the lateral and anterior margins of the thorax.

Elytra of about the same length as the thorax; their puncturation is much finer than that of the thorax, but is dense and not fine. They are clothed with a scanty, long yellowish pubescence, which is noticeable in the field. The scutellum is closely punctured, rather more finely than the elytra.

Abdomen above with a much finer and more scattered puncturation than the elytra, pubescence similar. The transverse dorsal line of the first three visible segments is triangularly produced in the middle.

Male with the anterior tarsi strongly dilated, head much wider than in the female, and with the last visible sternite widely but not deeply triangularly excised, the excision being partly filled by a membrane. The aedeagus has the median lobe narrowed evenly to the apex, which is slightly rounded, and the paramere considerably narrower than the median lobe and deeply but narrowly bifid for the greater part of its length, as in *discoideus* Grav. and *sanguinolentus* Grav.

Length, 9-13 mm.

The species, as is noted by Dr. Sharp in his original description, has the general appearance of *puella* Nordm., for which it might be passed over. It is however abundantly distinct from this and from all other known European species. The square posterior angles of the head and the puncturation of the thorax render it easy of recognition. It is, in fact, so distinct a species that when once known it can be recognised in the field without much difficulty.

I have taken the beetle not uncommonly in my own garden at Rous Lench in Worcestershire during the last six weeks, and also at Wixford (Warwickshire) on several occasions in equal abundance in the middle of June. In the same month my small boy caught one specimen at Tewkesbury. On going through some unnamed material which I had in alcohol, I found I had taken a single specimen at Inkberrow (Worcs.) in June, 1934.

On July 15th, while on the expedition to Bagley Wood (Berks) arranged by the Entomological Congress at Oxford, I did not have much difficulty in obtaining a good series from that locality. On my return home I found a specimen waiting for me taken by Mr. H. R. P. Collett at Patching Pond, Sussex, as long ago as August, 1932, and so to him belongs the honour of first capturing this interesting *Philonthus* in Britain.

I must express my gratitude to Dott. E. Gridelli for determining this species for me.

*P. rectangulus* was first described by Sharp from Japan (Trans. Ent. Soc. London, 1874, p. 42), where it is stated to be abundant in rubbish heaps at Nagasaki. It also occurs in Manchuria and Formosa. It was first described from Europe by Gridelli (l.c.) on specimens taken by Signor A. Dodero in Biella in 1927. Gridelli gives figures of the head and thorax and of the aedeagus. Subsequently it has been recorded from Germany, having been taken in a number of localities in the west (Ent. Blatter, Berlin, 1932, p. 36, 188). In North America it has a wide distribution, but has not yet been recognised as this species.

By a strange coincidence, at the same time as I first noticed the species in this country, I received a box of Staphylinidae taken by Monsieur H. Donnot at Mont Dore, Puy-de-Dôme, France, in June this year, and amongst them there was a single specimen of *Philonthus rectangulus*. I believe this is an addition to the French list.

The species occurs in heaps of dead vegetation and in manure heaps. I have little doubt that it is widespread over a large portion at least of this country, and that it could easily be found in many localities if looked for in suitable habitats. Apparently the heaps in which it is found must be in a particular condition, which may account for its having been overlooked. It is impossible to prove whether it is a recent addition to our fauna, or whether it is a long-established species which has been overlooked, but there are two facts which point to the latter, namely, it has been captured by three collectors without being recognised as a distinct species, I myself being one of them; and also I have been successful in finding it in so many different situations with ease when I have set out to do so.

The Rectory, Rous Lench,
Evesham, Worcs.
*July 17th, 1935.*

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## A NEW BRITISH WASP, *CROSSOCERUS EXIGUUS* (VAN DER LINDEN) (HYM., SPHECOIDEA).

BY O. W. RICHARDS, M.A., D.SC.

On June 30th, 1935, I captured a small black Crabronid in a sandy cutting in Bedgebury Park, West Kent. On examination it proved to be a male of *Crossocerus exiguus* (Van der Linden, 1829), a species widespread on the Continent but always rare.

In Dr. R. C. L. Perkins' key (1913, Trans. Ent. Soc. London: 388) to the male Thyreopinae it runs down to couplet 32, but differs from the two species there—*C. elongatulus* (Van der Linden) and *C. wesmaeli* (Van der Linden)—in having the ventral apex of the seventh antennal segment produced into a strong, blunt tooth. The clypeus, tempora by base of mandibles, a spot on the mesopectus in the hollow for the reception of the fore femora, are yellow; fore and mid legs yellow, except for dorsal streaks on the femora. The fore- and mid-tarsi are simple.

I have not been able to examine a female, but according to Kohl it differs from that sex in *C. elongatulus* and *C. wesmaeli* in lacking the fine striations on the mesonotum, just in front of the crenate furrow separating it from the scutellum. The superorbital foveae are more obsolete and the insect is rather smaller. Judging from the development of these characters in *C. wesmaeli* and *C. elongatulus,* the differences outlined above must be very small.

*C. exiguus* is known from Russia, Finland, Germany, Belgium, France, Switzerland and Austria; it might, therefore, well be expected to occur in this country, though its small size and resemblance to other common species might easily lead to its being overlooked.

29 Edith Road, London, W.14.
*July 8th,* 1935.

## A NEW SPECIES OF THE DIPTEROUS FAMILY PHORIDAE.

BY H. SCHMITZ, S.J. (VALKENBURG, HOLLAND).

Examining the specimens of *Megaselia flava* (Fallén) in my collection, I found three females having some prolonged hairs at the end of the ventral plate of the 8th abdominal segment, which were wanting in all the others. There were also some other differences: the 3rd antennal joint appeared to be a little smaller and of reddish colour, not bright yellow or yellowish white, as in the majority of the individuals; the palpi too were less broad and the costal vein a little shorter. Passing over to the males I noticed among them likewise two forms with similar differences, a shorter costal vein being always associated with smaller, reddish coloured antennae and narrower palpi. As regards the male hypopygium the two forms show nearly the same shape, but in the species which I consider as the true *flava* Fall. (with yellowish white antennae) the anal tube is a trifle shorter and the arms of the ventral plate, which is deeply cleft and furcated in both species, are slightly unsymmetrical; the right one is rounded at the end and the left one rather pointed and more or less triangular in shape. In the other species they are both rounded and of the same shape.

I think therefore that under the name of *Megaselia flava* Fallén two different though extremely similar species have been hitherto confused. This partly explains the variability of *flava* mentioned by Becker, Wood, Lundbeck and other writers.

The question now arises which of the two species is the true *flava* of Fallén. The types of *flava* are in Fallén's collection at Stockholm. According to a communication kindly sent to me by Dr. Roman, there are still eight type-specimens of *flava* there. Of these I have seen five and can state the following: two are females of *Phalacrotophora fasciata* (Fall.); one female belongs to the rare

Platypezid (or Empid) *Platycnema pulicaria* Fall.; one *Megaselia* sp. ♂ is in poor condition and undeterminable; finally, there is one female without antennae, but from the shape of the palpus and the length of the costal vein it is evident that it represents one of the two species of „*flava*" hitherto confused, *viz.* the species with the larger and brighter antennae. I cannot but make this specimen the holotype of *flava* Fallén. For of the three specimens I have not seen, two, according to Dr. Roman, have the costal cilia rather long, and in the third (the specimen from Ostrogothia mentioned by Fallén) both head and abdomen are wanting. Accordingly none of them is fit to be chosen as holotype of the species.

It seems certain to me that the specimen chosen by me belongs to the prototypes, which Fallén had before him when he described his *Trineura flava,* since there is no other example among the eight to which Fallén's words apply so well: „Nervus alarum costalis ultra medium costae fere descendit brevissime ciliatus."

The other species (with reddish and smaller antennae) is new to science and must receive a new name. If there were any synonyms of *flava* Fall. it would be necessary to examine their types and to see whether one of them could refer to this species. But no synonyms of *flava* are known to me. It is true that *bicolor* Meig. could be taken as such a synonym, since in Meigen's collection at Paris there are two pretended type-specimens of *bicolor,* ♂ ♀, of which the female is a „*flava*" Fall. (the male is *lutea* Meigen.) But this individual has yellowish-white antennae, as Mr. Séguy says in a letter to me, and even if it had small reddish antennae, we would not be entitled to apply the name *bicolor* to the present species. For as I was able to show (Revision der Phoriden, Berlin, 1929, p. 17) the Paris specimens are not the genuine prototypes of Meigen's *bicolor.*

I therefore propose the name *flavicans* n.sp. for this species, and I shall collect its characteristics in the following diagnosis :—

♂. Frons as in *flava,* greyish-black or dark brown, dull; antial bristle in the same height as the first lateral one or a little below it and nearer to it than to the upper supraantennal; supraantennal bristles unequal, the lower not minute but half the size of the upper or a little more; the upper supraantennals a little more approximate than the preocellars, the lower still more approximate. Antennae distinctly smaller than in *flava,* reddish, never bright yellow or yellowish-white as in *flava,* as a rule somewhat darker than the yellow palpi. Arista as in *flava.* Palpi a little longer and less broad than in that species. Thorax in the six specimens before me reddish-yellow. Abdomen with the segments 1 to 5 more or less brownish, only the sixth distinctly lighter, red or yellow; also the first segment and the base of the second may be reddish-brown, but on the whole the abdomen seems to be darker than in *flava,* where often individuals occur with a mainly yellow abdomen, only with the middle segments more or less dark. Hypopygium as in *flava*, perhaps relatively a little larger, greyish-red or darker, the anal tube a little longer; the furcated ventral plate with symmetrical arms, in the quiescent state almost reaching to the end of the hypopygium. Legs as in *flava*, especially as regards the hind tibiae and their posterodorsal bristles. Wings as in *flava*, but the costa a little shorter, reaching exactly to the middle or very slightly beyond (0.51), whilst in *flava* the costa extends generally to 0.53—0.54 of the wing-length. Length without anal tube about 2 mm.

♀. Similar to the male, the thorax sometimes a little darker above, abdominal segments more or less brown, the first and last ones not distinctly clearer. The ventral plate of the eighth segment, which in *flava* is divided in two small chitinous spots, in the present species seems to be larger and undivided; at its hind margin there are a few longish hairs more or less parallel to one another, extending backwards and going beyond the end of the abdomen; they are bent upwards at the end. Length 1.8—2 mm.

*M. flavicans* seems to be less common than *flava*, though widely distributed. I have in all nine specimens, six males and three females. The localities and dates are: Spaubeek 22.ix.1917 and Limbricht 29.ix.1918 (Holland); Bonn a. Rhein 11.v.1921 (Germany); Ordrup 1.viii.1927 (Denmark); Budapest 26.iv (Hungary); Feldkirch 31.viii.1920 (Austria); Fribourg 13.viii.1925 (Switzerland); Mori 10.ix.1891 (Lake Garda, Italy); one female from Corfu. As Dr. Wood in his paper on the British species of Phoridae mentions individuals with red antennae, the new species probably occurs also in Britain.

## ON THE OCCURRENCE OF *MEGASELIA FLAVICANS* SCHMITZ IN BRITAIN.

BY J. E. COLLIN, F.R.E.S.

Thanks to the kind thought of Father Schmitz in sending his MS. to me before publication, I am able to add this note confirming his suspicion that *Megaselia flavicans* would be found in Britain. I find that I possess six males and three females of this species taken by myself in the garden of Sussex Lodge, Newmarket (Suffolk) in September and October, 1909, and September, 1922, and in addition a male given to me by Prof. J. W. Carr which he captured in Bulwell Hall Park (Nottingham) on May 24th, 1916.

Raylands, Newmarket.
*July 10th*, 1935.

## *CONOPS (LEOPOLDIUS) SIGNATA* WIED. IN BRITAIN.

BY COLBRAN J. WAINWRIGHT, F.R.E.S.

*Conops signata* was first recorded in 1910, in this Magazine, as a British insect, by Mr. J. Collins (Vol. XLVI, p. 273), and Mr. J. E. Collin added a note about its name. Mr. Collins had taken a pair at Tubney, Berks., on September 11th, 1910, sweeping them by chance from a birch tree. Mr. J. E. Collin recently obtained a further example, a ♀, from the collection of the late Col. C. G. Nurse, who had taken it at Timworth, W. Suffolk, in August, 1905, and these three were the only British specimens known until the species was found by me on Abberley Hill, Worcestershire, in 1933 and 1934. Only one specimen was taken in 1933, on August 27th, and that by a curious chance. I was visiting the hill for the first time with some non-entomological friends, and expressed a wish to run up to the top to see the view, and took my net with me. There I saw some *Conops*, and took one to show my friend, who would, I knew, be interested in the mimicry, and afterwards, instead of releasing it, put it into my pocket. At home I discovered what I had taken, and remembered also that while I was there I had seen others, but could do nothing more at the time.

The place is somewhat difficult of access without the aid of a car, but when the anniversary of the date arrived in 1934, with fine weather, I made the necessary effort, and on two days, August 26th and September 2nd, managed to secure eight more specimens.

It is so like the common *C. quadrifasciatus* Deg. in general appearance that it may easily be overlooked, but of course on examination the short, stumpy proboscis enables it to be distinguished at once; and, moreover, the very straight parallel edges to the abdominal bands afford a further character which, once it has been noted, would, at any rate in the case of the ♂♂, lead to easy recognition in the field.

The circumstances of its occurrence may be worth describing. The part of the hill where they were found is open and covered mainly by bracken, with a mixture of bramble, hawthorn, etc. Wasps were abundant and were busy working the bracken, presumably for prey, and the *Conops* were flying with them. It was most difficult to distinguish the occasional fly from amongst the very numerous wasps, especially as they rarely settled. Occasionally one did settle for a moment on a bracken frond and, so far as I could judge, usually folded its wings, although I did see one or two certainly with wings extended in the familiar *Conops* fashion. The wasps frequently settled, usually, however, running at once behind the fern fronds out of sight, in search of their prey, whatever it was, whilst the flies remained stationary until they flew away again, which they did very soon. They settled so rarely, however, that to collect them it was usually necessary to spot them flying, and most of mine were caught that way. One had to strike at every 'wasp' that looked as if it might be 'different,' and sometimes it proved to be the *Conops*. All that I took were males; the habits of the female are presumably different, but perhaps they were busy egg-laying elsewhere.

It seems likely that the species is not so rare as one has hitherto supposed, but has been overlooked on account of its resemblance to the commoner species, its habits, and its occurrence so late in the year.

It is open to question whether it is necessary to erect a separate genus for the species of *Conops* with short proboscis, but if it is decided to do so it cannot be called *Brachyglossum* (*recte Brachiglossum*), as Rondani in 1843 (Ann. Sc. Nat. Biolog., X, 34) had already named them *Leopoldius*, and his later action in withdrawing this name and substituting *Brachiglossum* instead, because someone had objected to mere insects being named after distinguished members of ruling families, was of course ‘ ultra vires.’ The specific name, however, must remain uncertain for the present. Séguy (Enc. Ent. IX, Mouches parasites, pp. 12-18) following Kröber (Lindners, Die Fliegen, 35, pp. 4-6) believes that he has recognised two species in what may be called the *signata* complex, which he calls *brevirostris* Germar. and *erostratum* Rond., but does not seem to have been able to decide which was the original *signata* Wied., as he has placed that name impossibly as a synonym to both. It would seem likely that the problem might be solved if we could get a series of the ♀♀ of our species, but all mine were ♂♂ and Mr. J. E. Collin's one ♀ does not provide a decisive answer to the queries. For the moment, therefore, I am retaining the use of *signata* as the oldest available name.

172 Hamstead Road,
Handsworth, Birmingham.
*June 1st*, 1935.

## A REVISED LIST OF THE BRITISH SIPHONAPTERA.

BY GORDON B. THOMPSON.

(Department of Entomology, British Museum (Nat. Hist.).)

Since the publication of Rothschild's ‘ Synopsis of the British Siphonaptera ’ numerous changes have been made in the nomenclature of the species. In the following list I have placed all the British species in their genera as now recognised and have made other corrections in order to enable those interested to have access to the modern nomenclature.

I have to thank Dr. K. Jordon, F.R.S., for his kindness in checking over my list.

### Family PULICIDAE.

Genus *Xenopsylla* Glinkiewicz (1907).
1. *Xenopsylla cheopis* Rothschild (1903).
Genus *Pulex* Linne (1758).
2. *Pulex irritans* Linne (1758).
Genus *Archaeopsylla* Dampf (1908).
3. *Archaeopsylla erinacei erinacei* Bouché (1835).
Genus *Ctenocephalides* Stiles & Collins (1930).
4. *Ctenocephalides canis* Curtis (1826).
5. *Ctenocephalides felis felis* Bouché (1835).
Genus *Spilopsyllus* Baker (1905).
6. *Spilopsyllus cuniculi* Dale (1878).
Genus *Ornithopsylla* Rothschild (1908).
7. *Ornithopsylla laetitiae* Rothschild (1908).

### Family CERATOPHYLLIDAE.

Genus *Ceratophyllus* Curtis (1832).
8. *Ceratophyllus styx* Rothschild (1900).
9. *Ceratophyllus waterstoni* Jordan (1925).
10. *Ceratophyllus hirundinis* Curtis (1826).
11. *Ceratophyllus rusticus* Wagner (1903).
12. *Ceratophyllus farreni* Rothschild (1905).
13. *Ceratophyllus garei* Rothschild (1902).
14. *Ceratophyllus columbae* Walckenaer & Gervais (1844).
15. *Ceratophyllus vagabunda insularis* Rothschild (1908).
16. *Ceratophyllus borealis* Rothschild (1902).
17. *Ceratophyllus gallinae* Schrank (1803).
18. *Ceratophyllus fringillae* Walker (1856).
Genus *Malaraeus* Jordan (1933).
19. *Malaraeus penicilliger* Grube (1852).
Genus *Nosopsyllus* Jordan (1933).
20. *Nosopsyllus fasciatus* Bosc (1801).
21. *Nosopsyllus londiniensis* Rothschild (1903).
Genus *Megabothris* Jordan (1933).
22. *Megabothris walkeri* Rothschild (1902).
23. *Megabothris turbidus* Rothschild (1909).
Genus *Monopsyllus* Kolenati (1857).
24. *Monopsyllus sciurorum* Schrank (1803).
Genus *Orchopeas* Jordan (1933).
25. *Orchopeas wichami* Baker (1895).
Genus *Dasypsyllus* Baker (1905).
26. *Dasypsyllus gallinulae* Dale (1787).
Genus *Paraceras* Wagner (1916).

27. *Paraceras melis* Walker (1856).
Genus *Ctenophthalmus* Kolenati (1856).
28. *Ctenophthalmus agyrtes nobilis* Rothschild (1898).
29. *Ctenophthalmus bisoctodentatus* Kolenati (1863).
Genus *Rhadinopsylla* Jordan & Rothschild (1912).
30. *Rhadinopsylla isacanthus* Rothschild (1907).
31. *Rhadinopsylla pentacanthus* Rothschild (1897).

Family LEPTOPSYLLIDAE.
Genus *Doratopsylla* Jordan & Rothschild (1912).
32. *Doratopsyllus dasycnemus* Rothschild (1897).
Genus *Palaeopsylla* Wagner (1903).
33. *Palaeopsylla sorecis* Dale (1878).
34. *Palaeopsylla kohauti* Dampf (1911).
35. *Palaeopsylla minor* Dale (1878).
Genus *Leptopsylla* Jordan & Rothschild (1911).
36. *Leptopsylla segnis* Schönh. (1816).
37. *Leptopsylla spectabilis* Rothschild (1898).

Family HYSTRICHOPSYLLIDAE.
Genus *Typhloceras* Wagner (1903).
38. *Typhloceras poppei* Wagner (1903).
Genus *Hystrichopsylla* Taschenberg (1880).
39. *Hystrichopsylla talpae* Curtis (1826).

Family ISCHNOPSYLLIDAE.
Genus *Ischnopsyllus* Westwood (1840).
40. *Ischnopsyllus elongatus* Curtis (1832).
41. *Ischnopsyllus intermedius* Rothschild (1898).
42. *Ischnopsyllus octactenus* Kolenati (1856).
43. *Ischnopsyllus simplex* Rothschild (1906).
44. *Ischnopsyllus hexactenus* Kolenati (1856).
Genus *Nycteridopsylla* Oudemans (1906).
45. *Nycteridopsylla eusarca major* Rothschild (1909).
46. *Nycteridopsylla longiceps* Rothschild (1908).

British Museum (Natural History),
Cromwell Road, London, S.W.7.
*June 7th*, 1935.

***Philonthus rectangulus* Sharp at Oxford.**—When Mr. Tottenham called on me during the recent Congress of the Society for British Entomology, he at once identified as *P. rectangulus* a pair (♀ ♂) of a large *Philonthus* which I had just mounted, and had taken with several more specimens since July 1st, in a heap of cut-grass within less than five minutes' walk of my house. Accompanied by Dr. K. G. Blair, we repaired to the spot, and we all took the beetle in a very short time. The condition of the heap is somewhat unusual, the grass being rather long, clean and dry externally, and in an advanced stage of moist, slimy, and rank-smelling decay in the centre. This heap has produced several interesting beetles, including among others *Aleochara crassiuscula*, *Carcinops 14-striata* and *Anthicus biguttatus*, the latter as yet only singly. *P. rectangulus* has recently been taken by Mr. J. Collins in decayed fungi near Oxford, and I have a fine ♂ which I took in a rather dry manure heap at Summertown last September, and had put aside as a possible variant of *P. puella*! It is quite easy to recognise in the field by its superior size, large head and parallel-sided build, and its somewhat Xantholiniform general aspect, besides which it is decidedly slower in its movements than the rather numerous members of the genus with which it is associated.—J. J. WALKER, Aorangi, Lonsdale Road, Summertown, Oxford: *July 18th*, 1935.

*Trigonogenius globulus in 'Argol.'*—In May, 1935, several students mentioned that there were insects in stored 'argol' at the Metallurgical Laboratory of the Royal School of Mines, South Kensington. On inspection I found that all the porcelain jars of argol, and the large tin in the store-cupboard, were heavily infested by beetles, which were breeding freely. The beetles were identified by Dr. Hugh Scott of the British Museum (Natural History) as *Trigonogenius globulus* Solier.

On enquiry I learnt that the insects had been observed in the laboratory at various times for several years. In order to find out if this infestation was unusual, I communicated with Messrs. Hopkins and Williams, Ltd., of Hatton Garden, who supplied the argol to the Royal School of Mines. They replied that their stock 'had been contaminated at various times.' It may be recalled that argol is a deposit which separates out in barrels of new wine, and that it contains a high percentage of potassium bitartrate (cream of tartar).

Captain F. Orme, of the Metallurgical Department, University of Sheffield, had noticed the same phenomena in his laboratory. He very kindly sent me some specimens, which proved to be *T. globulus*, and remarked that the argol had been standing in porcelain jars for over twenty years, that the surface was covered with live and dead adults, and that 'as far as we can judge the amount of material in the jar has neither increased or decreased throughout these years.'

Thus it would appear that *T. globulus* is frequently to be found in argol, although it has been more commonly recorded as living in granaries and mills, also in wood.

*T. globulus* was originally described from Chile, but seems to be widely distributed. Apparently no record of this insect has been made since Scott's account of it breeding in argol at Cambridge (Bull. Ent. Res. *12*, 133-134, 1921), in which article a complete review of the previous literature is to be found.—H. J. CRAUFURD-BENSON, B.Sc., D.I.C., Entomology Department, Imperial College of Science and Technology: *July 6th*, 1935.

*Additions to the Coleopterous Fauna of Scotland.*—Pressure of University work prevented me from doing much field work in 1934, nevertheless I managed to capture two species and one variety of Coleoptera not previously recorded from Scotland. While spending a week-end at Nethy Bridge early in July, I swept up from long grass, in a boggy area in a fir grove in a very wild part of the valley of the Nethy, some miles above the village, one specimen of *Gymnetron beccabungae* L.; the only previous records of this recent addition to our list being for districts in the extreme south of Britain—Fleet and the New Forest.

Mr. Donisthorpe took it in the south of Ireland. It is therefore apparently widely spread, but very local.*

The second species is *Heterota plumbea* Wat., of which a single specimen was found in its usual habitat, seaweed, on the coast at Aberlady Bay, on August 17th, in company with *Myrmecopora sulcata* Kies. Fowler (Col. British Islands, Vol. II., p. 65) casts doubt upon the accuracy of Bold's record of *plumbea* from Northumberland, but my capture of the species on the shore of the Firth of Forth shows that the species has a much more extensive range on our coasts than was considered probable.

The new Scottish variety was the var. *virens* Rottbg., of *Quedius cruentus* Ol.; as the type is rare in Scotland, I was much pleased to take one specimen of the variety in a dry dung-heap near the village of East Saltoun on April 21st; this form has been taken in Cumberland by Mr. Britten.

While recording these additions, I desire to withdraw the Scottish record of *Stenus atratulus* Er., which I made in 1927 (E.M.M., Vol. 63, p. 233). I have since that date taken more examples of what I thought were *atratulus* in the same locality—Gullane links—and a very careful re-examination of the whole of the material has convinced me that the insects are really only a small form of *melanarius* Steph. As Ganglbauer stated (' Die Kafer von Mitteleuropa,' Vol. 2, p. 575), these two species are extremely similar in general appearance, and the differences are chiefly comparative—in *atratulus* the puncturation is slightly coarser, the antennae shorter, and the elytra are somewhat longer in comparison with the thorax.—T. HUDSON BEARE, 10 Regent Terrace, Edinburgh: *June 17th*, 1935.

*A seaside beetle in London.*—On June 27th last I was coming into New Square, Lincoln's Inn, when I saw a beetle on the pavement with which I was not quite familiar. I picked it up, and on examination it turned out to be *Anoncodes melanura* L., usually found on groynes and other old timber on the coast, but I believe also fairly common in the docks. I took no particular notice of this, but in the afternoon of July 11th I found another crawling on the pavement of the Marylebone Road near the Station, and duly secured it. I had never personally taken the species before. It is evident that this beetle is fairly common in london. There was no old timber to be seen anywhere near where these specimens were found, and practically no timber is now used for the structure of London buildings.—H. LANGFORD LEWIS, The Fairway, Sandy Lodge, Northwood: *July 15th*, 1935.

[*Anoncodes melanura* has considerable powers of flight, and is sometimes met far inland. I have found casual specimens at Woking and at Oxford.—J.J.W.]

*Ectemnius dives Lep. in Glamorgan.*—Following on Mr. G. E. J. Nixon's introduction of this wasp to the British List (*antea*, p 57), is is of interest to record that I captured a single female on July 7th this year. The wasp occurred on the railway bank (a cutting) near Sully; this would be about midway between Penarth and Barry Dock, about three miles from the latter as the crow flies. This bank consists of a sandy loam in connection with an outcrop of carboniferous limestone, and has proved a productive collecting ground in the past, and this year has yielded another addition to the County list in a male of *Coelioxys quadridentata* L.; it is also the only locality in the east of the County for *Andrena hattorfiana* Fab. Amongst other interesting species are *Sphecodes spinulosus* v. Hag. and *rubicundus* v. Hag., and the scarce fly *Trypeta falcata* Scop.—H. M. Hallett, 64 Westbourne Road, Penarth: *July 16th*, 1935.

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* Since the above was written, Mr. P. Harwood tells me that he discovered the food-plant of the beetle, *Veronica scutellata*, at Nethy Bridge a few days ago, on which he took six specimens of the insect.

*Notes on Cacoecia* (*Tortrix*) *podana Scop.*—The biology of this species has been described in detail by Hey and Thomas (J. Pomology XII, Dec. 4th, 1934). Since then it has been found to be common in commercial fruit orchards in Holland; where it appears to be widely distributed, as it was found in several small orchards far away from the main fruit-growing areas. It was found on apple and also, but to a less extent, on pear. The amount of damage caused by this species to the fruit in the autumn appears to be on the increase in Holland; but, as yet, it does not seem to be as serious as in Britain. The only other species found in any numbers were *Spilonota ocellana* Fabr. and *Argyroploce variegana* Hubn. on both apple and pear. It has been found in Holland, as in Britain, that it is almost impossible to control these pests by the use of arsenate of lead in the spring.

In June, 1935, larvae of *Cacoecia podana* Scop. were found feeding inside curled leaves of Black Currant in Cheshire, this appears to be the first record on this host plant, although they have previously been recorded as feeding on 'Big Bud.'—G. L. Hey, One Tree House, Church Road, Leyland, Lancs.: *July 9th*, 1935.

*A list of Parasites bred from Tortrix and Tineid Hosts.*—While working at East Malling Research Station on the biology of some Tortricidae, a number of parasites were bred out. The Hymenoptera were identified by Messrs. G. J. Kerrich, G. E. Nixon, J. F. Perkins, Dr. A. Roman, D. S. Wilkinson, and the Diptera by Mr. J. E. Collin. The writer wishes to take this opportunity of thanking these gentlemen for their kind assistance.

The Hymenoptera obtained were :—

*Apanteles longicaudis* Wesm., all ♂, from larvae of *Batodes angustiorana* Haw. on apple, and an undetermined species of Tortrix on pear, East Malling.

*Apanteles* sp. from larvae of *Cacoecia podana* Scop. and *Batodes angustiorana* Haw. on apple, East Malling.

*Angitia* sp., ♂, from larva of *Peronea schalleriana* L. on raspberry, East Malling.

*Ascogaster* sp., from larva of *Spilonota ocellana* Fabr. on apple, Faversham.

*Chorinaeus ? cristator* Grav. Thn., ♂, from an undetermined species of Tineid larva, on poplar, East Malling.

*Glypta nigrina* Desv. (=*fractigena* Thu.), ♂ and ♀, from larvae of *Cacoecia lecheana* L., on apple, Farningham.

*Hemiteles areator* Panz., ♀, from larva of *Simaethis pariana* Clerck, on apple, East Malling.

*Itoplectis alternans* Grav., from larva of *Spilonota ocellana* Fabr., on pear fruit, East Malling.

*Macrocentrus abdominalis* Fab., from larvae of *Cacoecia podana* Scop., on apple, East Malling and Faversham, and *Batodes angustiorana* Haw., on apple, East Malling.

*Macrocentrus thoracicus* Nees., from larvae of *Argyròploce variegana* Hubn., on apple and pear, East and West Malling.

*Macrocentrus* sp., from larvae of *Cacoecia lecheana* L., on apple, Farningham.

*Meteorus* sp., ♀, from larva of *Spilonota ocellana* Fabr., on pear, East

Malling, and apple, Cobham; and a ♂ from pupa of *Simaethis pariana* Clerck, on apple, East Malling.

*Oiorhinus pallidipalpis* Wesm., from pupa of *Simaethis pariana* Clerck, host got as larva on apple, East Malling.

*Omorga ? biloba* Thoms., ♀, from larvae of *Cacoecia podana* Scop., on apple, East Farleigh and East Malling, and from larva of *Tortrix diversana* Hubn., on apple, East Malling.

*Phobocampa* sp., ♂, from larva of *Cacoecia podana* Scop., on apple, East Malling.

*Pristomerus vulnerator* Panz., ♀, from larva of *Cacoecia podana* Scop., on apple, East Malling.

Two Dipterous parasites were also bred out:—

*Actia pilipennis* Fln., from larva of *Batodes angustiorana* Haw., on apple, East Malling.

*Nemorilla notabilis* Mg., from larva of *Cacoecia podana* Scop., on apple, Farningham.—G. L. Hey, *July 9th*, 1935.

## Obituary.

*Robert Adkin, F.R.E.S.*—It is with sincere regret that we record the death at Eastbourne on May 21st of this highly esteemed Lepidopterist. Robert Adkin was born on January 4th, 1849, and until the last few months of his long life of eighty-six years he retained so much of the characteristic vigour and activity of his younger days that to many of his friends the news of his decease was an unexpected shock.

From his early youth an enthusiastic observer and collector of our native Lepidoptera, in the leisure afforded by the exigencies of an important and highly successful business career, his name was for many years a household word with the students of that Order, and especially with the members of the various London societies. With two of these his association was most intimate—the South London Entomological Society, which he joined as long ago as 1882, and was its President on no fewer than five separate occasions; and the now Royal Entomological Society of London, of which he became a Fellow in 1885, was a Vice-President in 1922 and 1928, and in recent years has been one of its most generous benefactors. As one of the members of the Entomological Club, his annual meetings at Lewisham, and later at Eastbourne, where he took up his residence in Professor Huxley's former house in 1915, were famous for their cordial hospitality, and were greatly appreciated by those who had the privilege of attending them.

Although he was not a contributor to our own pages, he was a voluminous writer on his favourite subject, and his best-known work, 'The Butterflies and Moths of Eastbourne,' is a model of what such local lists of insects should be.

We understand that his very fine and complete collection of British Lepidoptera is bequeathed to the Natural History Museum, and that he has left to the Royal Entomological Society such volumes from his equally fine library as may be selected by the Council.

Few if any of the Entomologists of the present day have left behind them on their decease such a host of friends and such cherished memories of a long and well-spent life as Robert Adkin. To his widow by his second marriage, his son, and his two daughters we extend our heartfelt sympathy in their bereavement.

# Society

The First Annual Congress of the Society for British Entomology was held in the Oxford University Museum from July 12th to 15th, in co-operation with the Ashmolean Natural History Society of Oxfordshire, and was attended by about seventy members of both these Societies. The proceedings of the Congress were opened on the morning of the 13th by a cordial address of welcome by Sir E. B. Poulton, D.Sc., F.R.S. The President, Professor G. D. Hale Carpenter, M.B.E., F.L.S., then gave a discourse on 'Courtship and Allied Problems in Insects,' which was greatly appreciated and evoked a highly interesting discussion before the official photograph of the Congress was taken in the Museum grounds. An informal but very pleasant conversazione was held in the evening on the lawn of Jesus College, previous to the Congress dinner in the College Hall. The morning of the 14th was occupied by an excellent address on 'Insect Migration' by Dr. C. B. Williams, M.A., Sc.D., followed by a highly interesting discussion on this important subject, in which Capt. T. Dannreuther, R.N., and other county observers took part. Dr. K. G. Blair's discourse on 'Wegener's Theory of the Movements of the Earth,' with its bearing on the present geographical distribution of animals and plants, was also listened to with much interest. A large number of exhibits were shown in the Hope Department of the Museum, and among these Dr. B. M. Hobby's extensive series from all parts of the world of predacious insects and their prey, Mr. Donisthorpe's nearly complete museum set of Windsor Forest Coleoptera, and the beautiful Irish forms of butterflies brought by Mr. T. Greer deserve special mention. Throughout the Congress the weather was perfect, and the great heat made the long field-day in Bagley Wood, Berks, a rather strenuous business, though many interesting insects of all Orders were observed. At the closing meeting on the previous day, after the President's farewell address, it was announced that the next Annual Meeting of the Congress would be held at Cambridge.—J.J.W.

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## REMARKS ON THE NAME OF *BORIOMYIA BETULINA* (STRØM) (= *HEMEROBIUS NERVOSUS* FABR.) (NEUR.): A REPLY TO MR. K. J. MORTON.

BY FREDK. J. KILLINGTON, B.SC., A.L.S., F.R.E.S.

My friend Mr. K. J. Morton has recently (1935) argued at considerable length against the application of the name *Hemerobius betulinus* Strøm (1788) to the insect subsequently named *Hemerobius nervosus* by Fabricius (1793). As Mr. Morton's paper was inspired mainly by my adoption of Strøm's name in a recent account (1934) of the life-histories of certain Hemerobiidae, I should like to give the reasons which led me to take this action.

Before my account of the life-history of *betulina* was published the controversy had centred entirely round Strøm's description and figures of the imago, and although Morton has given a brief summary of this controversy it appears to me that he has neither done sufficient justice to Strøm's work, nor given full value to the opinions of McLachlan (1899) and Dr. Esben-Peterson (1925).

Judged by modern standards, Strøm's description and figures of the imago are undoubtedly somewhat crude, yet one can scarcely label as merely an 'entomological curiosity' an eighteenth century description which goes considerably beyond most of the early descriptions of insects and which even includes a reference to the male genitalia, and a figure of a wing (Tab. V, Fig. 5) which shows the venation with such accuracy that it is possible to place the insect at once into a modern genus. This figure definitely fixes *betulina* as belonging to the small group of species now placed in the genus *Boriomyia* (Banks, 1905). Morton's remark that a *Hemerobius* may possibly have been included in Strøm's material is pure conjecture, and it can only be said that there is absolutely nothing to lead one to suppose that this was so. The facts are these: that the description applies well to a *Boriomyia,* and that the figure of the venation puts this point beyond all doubt. It remains, therefore, to determine the species of *Boriomyia* with which Strøm was dealing.

*Betulina* is described as having a black head, a yellow prothorax bordered on each side with black, and two bent hooks placed side by side at the apex of the abdomen. The description of the prothorax might apply to several species, but, as far as I am aware, there are only two species in which the head is sometimes black, viz. *B. nervosa* (Fabr.) and *B. subnebulosa* (Steph.). In *B. fassnidgei* Killington (1933) the head (in the type) is dark fuscous brown, but the prothorax is not marked with a yellowish vitta. *B. rava* Withycombe (1923A) and *B. baltica* Tjeder (1931) both have the epicranium constantly very pale. In all the specimens of *B. mortoni* McLachlan (1899) which I have examined the epicranium is pale ochreous-brown with a dark median line. *B. enontekiensis* Klingstedt (1929) is described as having the face and genae shining castaneous brown and the vertex yellowish-brown. In both *B. nervosa* and *B. subnebulosa* the prothorax has a yellowish vitta bordered with dark fuscous or blackish and, although the epicranium is frequently testaceous or ochreous in the middle and blackish only at the sides, there is a not uncommon form in which the whole head is almost or entirely black. Finally we have to consider the two bent hooks placed side by side at the apex of the abdomen. In the genus *Boriomyia,* as in other Hemerobiidae, the tenth tergite is divided into two latero-dorsal lobes, and these are the structures to which Strøm refers. Two species, *B. nervosa* and *B. subnebulosa,* are remarkable for the elongate and hook-like form of the lobes. Other species have the lobes shorter and more band-like, and with a short inwardly, or inwardly and downwardly, bent apex; in none may they be described with any accuracy as hooks. One is thus forced to the conclusion that Strøm's material consisted either of both *nervosa* and *subnebulosa* or of one only of these. The evidence points to *nervosa,* for in this species the lobes of the tenth tergite are placed side by side, do not cross one another and are more obviously hook-like; in *subnebulosa* they are strongly inturned and crossed, and their hook-like form is less easily appreciated.

The fact that, to quote Morton, McLachlan's ' first impression after examining Strøm's figures favoured *B. mortoni* (a species already known to him from Continental specimens but at the time still undescribed) as the form of Strøm's wing-figure seemed to him to agree better with that species than with *nervosa* ' is not very important. Before describing *mortoni* McLachlan naturally had to consider very carefully all previously described species, and *betulina* was obviously in the *mortoni* group (i.e. the modern genus *Boriomyia*); the important fact is that he discarded his first impression and made a new species of *mortoni*.

It may be well at this stage to quote McLachlan's published opinion of *betulina* (1899) at somewhat greater length than Morton has done: ' I have a very strong opinion that this insect [*nervosa*] is in all probability Strøm's *H. betulinus,* and it is *solely* [the italics are mine] my dislike for upsetting existing nomenclature that deters me from adopting the name. Strøm's description is full (and there is a good figure), even to the male appendages, which so far as I can make out were as in *nervosus* and not the allied species. In fact, the whole account was far in advance of the times.' It should be noted that this statement is taken from the paper in which McLachlan describes *mortoni*.

Morton states that Dr. Esben-Petersen (1925) has adopted *betulina* for *nervosa* ' without a scrap of fresh proof.' Full weight must, however, be given to the carefully considered verdict of such an eminent Neuropterist as Dr. Esben-Petersen, who writes: ' His [Strøm's] description and his figures of the imago are excellent of the times, and they show very clearly that the species is the same as *H. nervosus* Fabr. Especially the description of the anal appendages of the male (Bagdelen er krum og nedadbøjet med 2 jaevnsides siddende krumme Hager i Rumpen) excludes all doubt.'

It may be added that Mr. D. E. Kimmins has taken the same view as Esben-Petersen and has consistently treated *nervosa* as a synonym of *betulina*.

Thus it will be seen that, even if one considers Strøm's description and figure of the imago only, there is a very much stronger case to be made for the adoption of the name *betulina* in preference to *nervosa* than is possible for many of the early names in entomological nomenclature, and that the most that can be said against its adoption is that there is a very remote possibility that *subnebulosa* is involved.

It is now necessary to turn to the larva, and it is with a very detailed comparison of the figures given by Strøm and myself that much of Mr. Morton's paper is occupied. Such a detailed comparison is unfortunate from several points of view.

In the first place one would naturally expect to find many discrepancies between one of the earliest attempts to figure such a difficult subject as a Hemerobiid larva and a figure executed with the advantages of modern instruments and knowledge. There are some obvious slips in Strøm's figure. The tarsal claws are exaggerated in size and so also are the latero-dorsal sclerites of the meso- and metathorax and abdominal segments. The anterior margin of the head is not shown at the base of the jaws, although Morton is in error when he states that the jaws are 'broadly confluent with each other at the base'; Strøm has simply omitted to draw in the anterior margin of the head where it runs across the base of the jaws, and that portion of the head which Morton appears to regard as the fused bases of the jaws is, in fact, the clypeus and labrum. The eyes are indicated by circles, whereas each actually consists of a group of slightly separated elements (only easily seen under a high magnification). The oval and slightly crescentic prothoracic sclerites are shown convex on the outer instead of on the inner side; but here again an error has been made, for the form of these sclerites is similar throughout a genus and of no value for specific determination. There are several other errors of a similar nature, yet looking at Strøm's figure one is struck, not by the crudities and mistakes, but by the degree of accuracy attained and the amount of detail shown, and it is possible with a knowledge of structure and colour pattern in Neuropterous larvae to judge what is of value or otherwise in such a figure.

Much of Morton's criticism of Strøm's figure falls to the ground because he has failed to distinguish between what is and what is not significant. That this is so is further illustrated in another direction. He states that the 'V-shaped mark' on the head is conspicuous in Strøm's figure and barely visible in mine. Mr. Morton must, however, be aware that in *all* Neuropterous larvae the epicranium is separated from the frons by a V-shaped frontal suture, and it is this line which has been detected and drawn in by Strøm. When the rest of the head is mainly pale such a line naturallv becomes conspicuous in a figure, very much more so than in the actual larva; and it was for this reason that I did not indicate the suture by a line in my own figure. Morton appears to have confused this suture with the dark wedge-shaped mark which it so often encloses in Hemerobiid larvae. Another character selected by Morton in his comparative table (p. 98) is the shape of the anterior subsegment of the prothorax, which in Strøm's figure is more or less round, in mine transverse. This again is a most unfortunate character to seize upon, for the form of the subsegments and segments varies with the occupation of the larva: the particular subsegment referred to may be very transverse when the larva is resting, or considerably lengthened during periods of activity. A similar misunderstanding of the nature of these larvae is shown by Morton on p. 97, where he refers to the fact that Strøm shows nine abdominal segments instead of ten and concludes that this is an error. The terminal abdominal segments are, however, telescopic, and it frequently happens that one of these is almost or entirely out of sight. It will thus be seen that, as far as structural characters go, the discrepancies between the two figures under discussion are accounted for either by errors in Strøm's drawing which are at once obvious to anyone who has studied Neuropterous larvae, or by different attitudes adopted by the larvae selected for figuring. In any case, structural differences in the larva do not, unfortunately, appear to exist between closely allied species, so that it is useless to expect such characters to help us to decide whether Strøm's figure refers to *subnebulosa* or *nervosa*.

Finally, there is the question of colour and pattern, and it is on these characters that we have almost entirely to rely when attempting to distinguish between the different species of any one genus. The head markings are due to chitin pigmentation and the laterodorsal body markings to hypodermal pigment, but although some allowance must be made for variation, both are fairly constant for a given species. Other colours are, however, produced by the fat body and by the contents of the alimentary canal, and these are far less reliable. The fact, therefore, that Strøm's description gives the ground colour as yellowish or reddish while I describe it as cream white to white is a less important difference than might at first sight appear. To illustrate the range of variation in ground colour possible in Hemerobiid larvae, one may remind Mr. Morton that the larva of the common *Hemerobius stigma* varies in this respect from cream white to pale brown or pink. The real test of the value of Strøm's figure rests, therefore, on his attempt to depict the head markings and body pattern, and it must be remembered that our task is simplified by the fact that his description of the imago leaves us only to decide whether he was dealing with *B. subnebulosa* or *B. nervosa*. The shading in the figure is obviously of two kinds: that intended to give roundness to the body and its various parts, and that intended to show colour pattern. If the figure reproduced by Morton on Pl. IV be examined, it will be seen that the first type of shading exists on the extreme sides of the body, especially on the right side, at the transverse sutures between the subsegments and segments and probably also on the posterior portion of the head and anterior half of the first subsegment of the prothorax; the second type of shading indicates for the most part latero-dorsal markings which on the abdomen form two irregular and somewhat sinuous longitudinal bands. Whatever is intended by the shading on the head, it will be noted that it is confined to the posterior part of the head and certainly does not go beyond the level of the middle of the eyes.

Now let us consider the larvae of *B. subnebulosa* and of *B. nervosa*. The first has been carefully described and well figured by Withycombe (1923 B), and I quote from his description (I have had many opportunities of checking this). He gives first a brief general impression as follows: 'Colour uniformly dusky, head blackish, body dove-grey to brown.' In the more detailed part of his description he states: 'Head uniformly dark, a central wedge-shaped portion may be delimitated by a lighter line running on each side of it. . . Body uniformly brownish-grey. There are sometimes indications of a pair of darker latero-dorsal lines, but as a rule these are hardly visible, except on the prothorax.' The dark head and uniformly dusky body are the outstanding characteristics of *B. subnebulosa* and this very definitely is not the larva described and figured by Strøm. The larva of *B. nervosa* (under the name *betulina*) has been described and figured by me in the paper (1934) to which Morton refers in his article. This larva is more mottled or variegated than *B. subnebulosa*, the main markings forming two irregular latero-dorsal bands which on the abdomen take a rather sinuous course. The markings of the head are confined to the posterior portion and extend almost to the eyes. The wedge-shaped area enclosed by the frontal suture is pale (not dark as in *subnebulosa*). It will be seen that, apart from details, the general pattern is similar to that shown by Strøm's figure of *betulina*.

The case for the adoption of Strøm's name *betulina* in place of *nervosa* (Fabr.) may, therefore, be summed up as follows :—

(1) Strøm's figure of the venation definitely places *betulina* in the genus *Boriomyia* Banks.

(2) There can be little doubt that Strøm's description of the imago refers to the same species as *nervosa* (Fabr.), a conclusion which is most strongly supported by the description of the anal plates of the male (Dr. Esben-Petersen states definitely that there can be no doubt, whilst McLachlan states that only his reluctance to sink the Fabrician name prevented his adoption of *betulina*).

(3) The only other species that could possibly be involved is *B. subnebulosa,* although this is extremely unlikely.

(4) The larva of *betulina* figured by Strøm bears no resemblance to *B. subnebulosa,* but is a fair representation of *B. nervosa.*

In view of these facts it is obvious that *nervosa* (Fabr.) must sink as a synonym of *betulina* (Strøm).

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# SYSTEMATIC NOTES UPON BRITISH AQUATIC COLEOPTERA.

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## PART VII. *ILYBIUS* AND *COPELATUS.*

In the Genera Dyticeorum, 1832, Erichson took *Ilybius* and *Copelatus* out of the old genus *Colymbetes,* separating the former on two characters, one the form of the labial palps, the other the proportionate length of the external post-tarsal claw. In *Colymbetes,* the outer claw is only about one-third the length of the inner, whereas in *Ilybius* it is about two-thirds. In *Colymbetes,* the apical segment of the labial palp is obviously longer than the penultimate, whereas in *Ilybius* the two segments are more nearly the same length. Sharp (1882), however, separated the genus upon the presence of a short row of spines or 'ciliae' at the postero-external angle of the post-femora, a character present in a number of genera, which he grouped together in the 'Agabini,' and absent from the 'Colymbetini,' Ilybius separating from all the other 'Agabini' by reason of its unequal post-tarsal claws.

Gemminger and Harold (1868) emended *Ilybius* to *Ilyobius* and Des Gozis (1886) substituted *Idiolybius,* for which he was taken to task by Sharp (1887) and later (1910-14) he accepted *Ilybius,* making *Idiolybius* a subgenus for *fenestratus.* Sharp (1882) divided the genus into two groups, Group I with post-tarsi of the male with the segments margined at their lower edge, Group II, including *fenestratus,* being without this margin. There seems to be no good reason for founding a subgenus upon this character, which is not well marked in some of the Group I species.

There are seven British species, concerning a few of which there are some points of systematic interest.

*Ilybius fuliginosus.* Linnaeus (1761) described *Dytiscus uliginosus,* the bare description of which would certainly suit this species and has been so interpreted by some authors, but for some reason not too clear, this name has been attached to *Agabus uliginosus.* Schrank (1781) mentions *uliginosus* and gives Linnaean references (1761 and 1766) and Illiger (1798) gives Schrank's species as a synonym of Panzer's *lacustris,* which is given as a synonym of *fuliginosus* F. by Zimmermann (1920). Gemminger and Harold (1868), under *Ilyobius fuliginosus* give 'uliginosus Linn. (pars)' as a synonym. It is impossible to believe that Linnaeus mixed up two species so very different as *Agabus uliginosus* and *Ilybius fuliginosus,* and it seems probable that one of the earlier collectors identified one of the two as that described by Linnaeus without having seen a Linnaean specimen and thus started the double synonymy, just as Gyllenhal mixed up *Hydroporus morio* of Dejean and *H. melanocephalus* of Marsham. Since the Linnaean name has been attached, apparently universally, to the *Agabus*, I think that it should so remain.

*Ilybius subaeneus* is a species about the size of *obscurus*, but distinctly broader, and therefore gives the impression of being flatter. It has a very definite brassy appearance which is quite absent from *obscurus*. It is the only British species in which the male is without a longitudinal keel at the apex of the last visible abdominal sternum. The species is of particular interest because it appears to be a comparatively recent addition to the fauna, its entry into the country having apparently been made in South-East England and East Anglia. It was first recorded by Power (1866-7) when he received a female specimen from the neighbourhood of Peckham (West Kent), but Fowler (1887) described it ' very doubtfully as British ' and mentioned that it had never been found again. The species appears in the Victoria County History for Surrey (1902), the list of beetles having been compiled by G. C. Champion, H. Donisthorpe and R. W. Lloyd, a list containing six or seven Hydradephaga recorded for the first time for that county. I think it possible that this record, which is omitted from the supplementary volume of Fowler's British Coleoptera (1913), is Power's record, in the belief that Peckham is in Surrey. The first record since Power's is that of Edwards for Brandon (Suffolk West) (1889), and he and Thouless discovered it in the following year on Wretham Heath (Norfolk West), since which date it appears to have gradually extended its range in East Anglia and northwards, the latest records being for Durham (1931 )and Forfar (1933).

*Ilybius obscurus* is interesting because it possesses a form, given specific rank by Schiödte under the name *sexdentatus*, based upon the outer claw of the mid-tarsus of the male being strongly toothed. In every specimen I possess in which there is any sign of a tooth, even a slight projection on the inner margin of the claw, both the inner and outer claws of the front tarsus are similarly toothed, and where there is no suggestion of a tooth on the mid-tarsal claw, the anterior claws are smooth in outline. I have, in my collection, two specimens of *obscurus*, a male from Cambridge and a female from Somerset North, which for a long time I had placed as '*guttiger?*' They are both the size of a large *guttiger*, and it did not occur to me that they might be small *obscurus* until I began to study the differences between these two species, which are very much alike except in size. *Obscurus*, male, has, however, a longer keel on the last visible abdominal sternum with very definite longitudinal striae on each side of it, whereas in *guttiger* the striae are much reduced and mostly represented by longish punctures. The aedeagus is very similar in both species. The prosternal process differs slightly in the two species, but not as much, perhaps, as the figures suggest, although the difference is more marked in the female than in the male (see fig. 22 A and D).

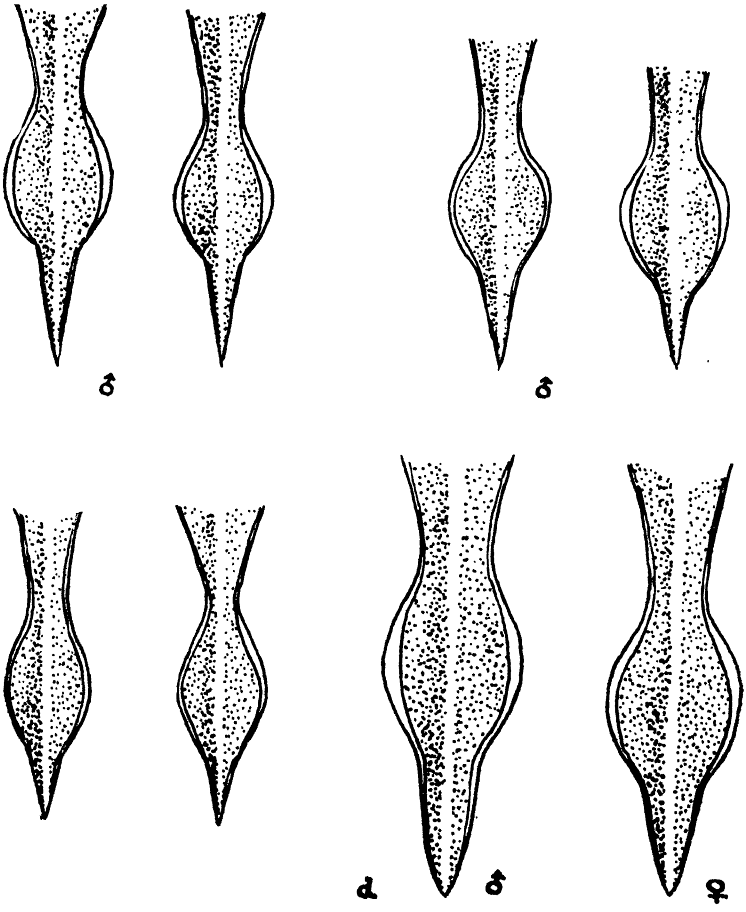

FIG. 22.—Prosternal process of (a) *Ilybius guttiger*, (b) *I. aenescens*, (c) *I. angustior*, (d) *I. obscurus*.

*Ilybius aenescens* was first introduced to the British list by Rye (1872) on an observation by Kraatz that there was an English example of the species in the collection of the late Dr. Schaum. Up to that time our specimens had been named *angustior* Gyll., and it was only in 1870 that Thompson separated *aenescens*. The characters for distinguishing this species from *angustior*, as given by Thompson and repeated by subsequent authors, are trivial, consisting only of the absence of metallic reflection and the entirely ferruginous antennae in *aenescens*, *angustior* having the antennae pitchy at the apex. There is, however, one good character for separating the species, and that is the form of the prosternal process (see fig 22 B and C). The aedeagus is also very different in the two species (see fig. 23 B and C).

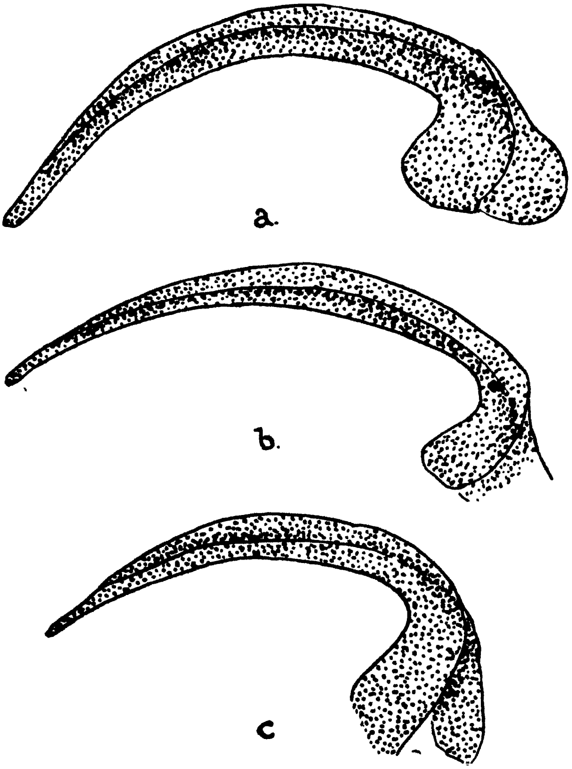

FIG. 23.—Aedeagus of (a) *Ilybius guttiger*, (b) *I. aenescens*, (c) *I. angustior*.

*Ilybius guttiger* is by no means easy to distinguish superficially from *aenescens*, as the 'distinct aeneus reflection' characteristic of the latter species is not always present. Fowler (1887) states that the two species cannot be satisfactorily distinguished except by the sexual characters, and says that the length of the carina on the apical ventral segment of the male and the proportionate length of the post-tarsal claws will separate the two. I should not like to rely upon differences in the carina of *aenescens* and *guttiger* and the accompanying longitudinal wrinkles, nor can I see any reliable difference in the post-tarsal claws of the males, although in the females the outer post-tarsal claw in *aenescens* is rather longer in proportion to the inner claw than it is in *guttiger*. The females are readily separated upon the form of the last visible sternum (see fig. 24 B and C), and the males by the form of the aedeagus, while the form of the prosternal process in both male and female separates the two species (see fig. 22 A and B).

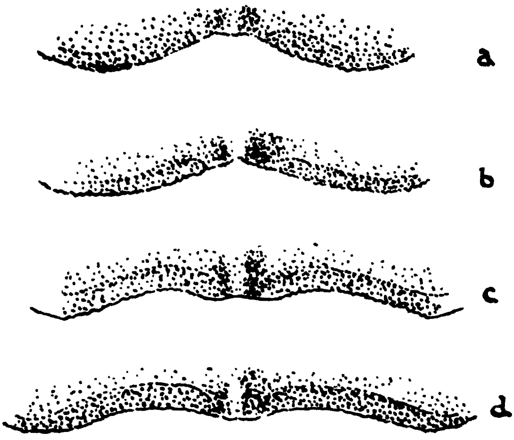

FIG. 24.—Last visible abdominal sternum of female of (a) *Ilybius angustior*, (b) *I. aenescens*, (c) *I. guttiger*, (d) *I. obscurus*.

All the British species of this genus possess sucker-hairs on the parameres of the male genital armature, a character otherwise unknown except in some, not all, species of *Rantus*, in *Agabus chalconatus* and in *Haliplus lineatocollis*.

The genotype, *Dytiscus ater*, was named by Hope (1838).

The British list is as follows :—

*Ilybius* Erichson (1932).
*fuliginosus* Fabricius (1792).
*subaeneus* Erichson (1837).
*ater* De Geer (1774).
*obscurus* Marsham (1802).
*guttiger* Gyllenhal (1808).
*aenescens* Thompson (1870).

. . . .

*fenestratus* Fabricius (1871).

*Copelatus* differs from *Ilybius* in having equal post-tarsal claws, but Aubé's difficulty (1836) was to distinguish it from *Agabus*. ' It differs really only in the median lobe of the mentum which is not excised, in the prosternum which is not compressed into a keel and is simply rounded, in the anterior and median tarsi of the male which are rather more dilated, and lastly in the posterior legs which are ciliated above and below in both sexes; a condition only found in the males of *Agabus*.' Sharp (1882) pointed out the extraordinary form of the post-coxae in this genus and mentioned that this and the way the coxal lines become excessively fine anteriorly so that they can scarcely be seen definitely, characterise the genus (see fig. 25).

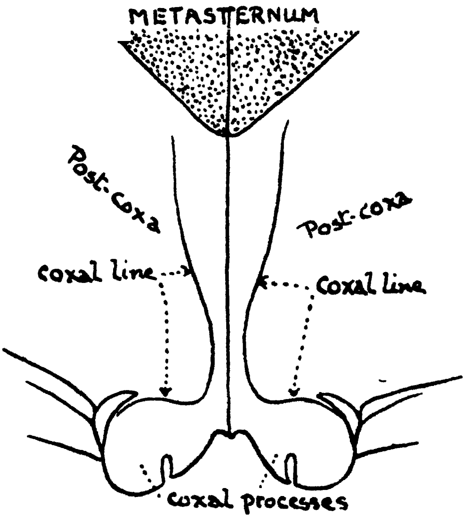

FIG. 25.—Post-coxal processes of *Copelatus* (*Liopterus*) *ruficollis* Schaller, showing the unique course of the coxal lines.

The genus was created by Erichson (1832) for the reception of *Dytiscus posticatus* Fab. and two other unnamed American species, so that *posticatus* is the genotype. In 1836 Aubé made a subgenus, *Liopterus,* to include those species with smooth elytra, but since the species with striae could equally well be grouped in subgenera based upon the number of striae, it is not clear why Aubé made the one subgenus. However, in my examination of *Dytiscid proventriculi* I found that the only two species of *Liopterus* I saw had one type of structure, while the only four of the other subgenus I possess have the other type, so that there seems to be something in the subdivision.

I have now come to the conclusion that the form of the *proventriculus* seen in *Liopterus* is more primitive and that evolution is going on in the family by which the grinding type is being changed into the filtering type, this genus being the only one I have so far discovered in which both types exist. It seems clear, therefore, that this subgenus must be maintained unless further reason is discovered for raising Liopterus to generic rank. The name is coined from the Greek 'λειοπτερος' meaning 'smooth-winged' in reference to the elytra being free from the striae found in the rest of the genus, and it is to be noted that, in the same year as Aubé made his subgenus, Schönherr (Gen. & Spec. Curc. I (1) 1833, 19) created the name 'Leiopterus' for a genus of Weevils. In spite of these two names having originated from the same Greek word, and differing only in a single letter, they are both good, according to the rules of nomenclature.

The only British species of the genus is what Fowler describes as *Copelatus agilis* Fab., but there seems to be no doubt that this is the same species previously described by Schaller (1783) under the name *Liopterus ruficollis*, his species name therefore having priority. If, later, this subgenus is raised to a genus, this species becomes the genotype, as it was so named by Hope (1838) under the name '*Dytiscus oblongus* Illiger.'

*Haliplus furcatus Seidlitz, a British species.*—Last year the first occurrence of this species was recorded from a specimen, fortunately a male, taken in Somerset North in 1916.* A single specimen of a species may be a chance immigrant, and, as eighteen years had elapsed and no other specimen had been recorded in that time, it certainly seemed an open question whether this species should be added to the British list. In April of this year, collecting in South Somerset, I came across a shallow strip of water by the Great Western Railway which had no doubt been formed many years ago, when the railway embankment was built. I took a few specimens of *Haliplus*, which in the field did not look quite right for any of our species. On examination under the microscope it was at once evident that they were something new, and dissection of a male proved that they were *furcatus* of Seidlitz. Returning to the collecting-ground next day, I found that the species was well established in the one stretch of water, but appeared to be absent from the neighbouring ponds. A visit to the spot some weeks later showed that the water was rapidly drying up, and it is to be hoped that this has led to the dispersal of *furcatus* and not to its extermination.

The pattern of the black markings on the elytra, although not so distinctive as in *fulvicollis* Er., of which *furcatus* was at one time described as a variety, is sufficiently different from that of other British species to attract attention, and an examination of the anterior tarsal claws (and aedeagus†) of the male at once separates it from the rest. The inner anterior claw is distinctly broader than the outer and is about the same length. The male is rather larger than the female. I only possess one continental female, an Austrian specimen, and it is impunctate between the elytral striae, whereas all my British specimens are very finely punctate from apex to base, much more finely so than the females of *ruficollis* or *nomax*.—F. BALFOUR-BROWNE, Winscombe, Somerset: *August 8th,* 1935.

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* E.M.M., 1934. p. 76.

† See fig. of aedeagus in my paper 'On the British Species of Haliplus, Latreille, etc, etc.' Ann. Mag. Nat. Hist., Ser. 8, Vol. xv, 1915.

# NEW AFRICAN LYCAENIDAE (LEP. RHOP.).

BY G. TALBOT, F.R.E.S.

(SUPPLEMENT.)

The types and other material of the species and forms here described are, unless otherwise stated, in the Hope Department of Entomology at the Oxford University Museum. The *Mimacraea* forms are described by permission of the Trustees of the British Museum. ...

Thanks are due to Professor G. D. Hale Carpenter for his help in enabling me to prepare this and the preceding paper on Lycaenidae. Also I am indebted to Mr. N. D. Riley, Keeper of Entomology at the British Museum (Natural History), for permission to compare specimens in the collection.

## The Genera *Cooksonia* Druce and *Sheffieldia* Druce.

The genus *Cooksonia* Druce was erected by H. H. Druce in 1905 upon the single ♀ specimen of the species *trimeni* Druce. No ♂ belonging to this species has so far been discovered. In 1912 Druce described the genus *Sheffieldia* upon the species *neavei* Druce, of which the ♀ is still unknown.

Between 1926 and 1932 Dr. W. A. Lamborn bred a series of both sexes of a *Sheffieldia* from larvae collected in Nyasaland, and in 1934 he bred a few others.

The distinction between *Cooksonia* and *Sheffieldia* was said to be in the position of veins 5 and 6 of the forewings. In *Sheffieldia* these arise from a point or short stalk, but in *Cooksonia* they arise quite separately. An examination of the series bred by Dr. Lamborn shows that the difference in neuration is mostly one of sex, but in one ♂ veins 5 and 6 arise as in the ♀. We can discover no character by which *Sheffieldia* can be distinguished from *Cooksonia,* and we must make it a synonym.

Our present knowledge of the forms and distribution of this curiously Acraea-patterned genus is as follows :—

(*a*) Forewing above with a white or ochreous apical patch.

1. *C. trimeni* Druce, Trans. Ent. Soc., 1905, p. 256, ♀ (N.W. Rhodesia).
2. *C. trimeni* sp.nov., ♀ (Katanga).
3. sp.nov., ♂ ♀ (Nyasaland).

(*b*) Forewing above with no apical patch.

1. *C. neavei* Druce, Ent. Mo. Mag., 49, p. 128, pl. 9, fig. 7, ♂ (1912) (Tang. Terr.).

## 1. **Cooksonia aliciae** sp. nov.

(Plate V.)

This species is distinguished from *neavei* Druce by the presence of an apical patch on the forewing above, and from *trimeni* by the wide marginal border of the hindwing above, by the scarcely toothed edge of the proximal area on hindwing below, and by the submarginal spots of the hindwing below being smaller and scarcely triangular.

♂. Upperside carmine to orange-ochreous, with broad black borders. Forewing with a pale ochreous apical patch formed of two spots in 6 and 7, with sometimes a dot below them in 5. The black marginal area extends to base of costa, forms a black marginal cell-spot above vein 2, and a black discocellular patch between which and the apical area the discal part of the carmine or orange area ends at vein 5 or is continued by dots in 5, 6, 9, 10. The marginal border is much broader than in *neavei* and reaches the inner margin; between the tornus and vein *2* it is 1.5 mm. wide, and extends thinly along the inner margin except for a short basal stripe. The veins crossing the proximal area are black. Hindwing with a marginal border of fairly even width, about 3 mm. The edge of the proximal area is sharply defined and only slightly irregular, paler on the costa, and the inner margin to vein *1a* mostly ochraceous. A prominent black discocellular spot as in other species.

Underside with the proximal area paler than above. On the forewing the carmine or orange area is extended over the cell to the costa and beyond the cell; costa only thinly edged with black, the discocellular patch smaller; two black dots in the cell and some black marks above the cell. Apical and submarginal spots orange or ochraceous, six in number, becoming smaller posteriorly, with sometimes a seventh spot below vein 2. A post-discal row of grey-white, somewhat triangular or lunate marks in areas 3—6, and sometimes two smaller marks in 8 and 9, forming a proximal border to the distal spots. Hindwing with ochraceous-brown proximal area, usually slightly reddish; black spots, edged with grey-white, as in the other species: one at base of costa, one at base of area 8 extending into base of cell, one in cell beyond middle, a large spot on the cross-veins, one in base of area 2, two below the cell in *1c*, a basal patch which forms a stripe in *1b* touching the proximal spot, and a large spot in 7 above the cell. The disposition of these spots is so much the same in all the forms that one may perhaps doubt whether the genus contains more than one species. A post-discal row of small black whitish-edged marks or dots forming an evenly curved row in *1b*, *1c*, 2—7, the one in 7 being larger than the others. Traces of this series of marks are found in the other forms. The border formed by the post-discal line on the proximal area is darker and more reddish. The black marginal border bears an antemarginal row of six orange and somewhat oblong spots; between these and the edge of the proximal area is a prominent row of 7 or 8 grey-white and somewhat triangular marks as in *neavei*.

Antennae, head and palpi black, ♀ sometimes with first and second segment of palpus pale buff at the sides; side of frons and tufts behind the antennae pale buff. Legs black, coxae orange, hind legs with orange patch on tibia. Abdomen black, banded with ochraceous-orange,, anal tuft orange, a small dull white ventral spot on segments 6—8. In the ♀ the femora are sometimes marked with an orange patch as in *trimeni* and others. In *trimeni* the palpi and legs are deep earth-brown.

♀. Upperside with more extended proximal area, leaving a black discocellular spot, no black mark in the cell, and narrow black costal border. Distal black wider than in the ♂. Apical patch white, the spots larger than in the ♂, with an additional small one in 4. Hindwing with an antemarginal row of five white marks in 1*c*, 2—5, otherwise as in the ♂.

Underside markings a little paler, distal spots larger.

Length of forewing: ♂, 21—22 mm.; ♀, 23—25 mm. Expanse: ♂, 44—46 mm.; ♀, 49—51 mm.

*Pupa.* Pale brown, mottled with darker brown, the wing-cases marked with black stripes. The whole dorsal and lateral surface furnished with hair. Large sub-spiracular tufts on each segment. The hair on dorsum of moderate length, brown to white. The posterior segments densely fringed with long, thick hair, each hair being minutely ciliate and curled at the tip, all brown to grey-white. One may regard these more as being hair-like filaments. On the dorsum between the lateral anal tufts is a dense covering of shorter, curly, matted white hair. The pupa appears to be attached by a piece of the larval skin, which still bears the six prolegs and two on the anal segment. These prolegs bear a semi-circle of numerous hooked processes as in other Liptenine larvae. A note on this structure and an account of other Liptenine larvae and pupae is given by Eltringham in Trans. Ent. Soc., 1921, pp. 473—488, pls. XII, XIII.

Length of empty pupa-case, 16 mm.

*Hab.*—NYASALAND: Maiwale, 12 miles east of Fort Johnston, 3,280 feet, pupa in rather thick bush 20.xi.1931, emerged 21.xi., 1 ♂ (type); id., larva 10.x.1926, pupated 9.xi., emerged 12.xi., 1 ♂; id., pupa on 30.xi.1931, emerged 5.xii., 1 ♂; id., pupa on 27.xi. 1931, emerged 2.xii., 1 ♀; id., pupa on 24.xi.1932, emerged 27.xi., 1 ♀ (allotype); id., pupa on 21.xi.1931, emerged 29.xi., 1 ♀; id., pupa on 28.xi.1931, emerged 3.xii., 1 ♀. Also in the B.M. from Nyasaland, 4 ♂♂, 1 ♀, and 5 pupa-cases, collected in December, 1934. The whole of the material was collected by Dr. W. A. Lamborn, who described the early stages as not unlike those of *Mimacraea marshalli* (Trans. Ent. Soc. Lond. 1924, Plate 12). The female was seen to oviposit on lichen-covered trees, on which larvae were found.

### 2. '*Cooksonia* **trimeni** *terpsichore*,' subsp. nov.

This specimen is so unlike typical *trimeni* that it is more probably a race than a ♀ form.

♀. Upperside pale ochraceous. Forewing shaped as in *aliciae*, and not as in *trimeni*, but the white apical patch almost as large as in the latter, the stripe in 7 longer than it is in *aliciae* ♀. The edge of the proximal area below vein 4 is toothed at the veins. Hindwing with much narrower black border. The submarginal spots in 1*b*, *c*, 2 and 3 touch the edge of the ochraceous area, those in 2 and 3 somewhat square; a dot in 4.

Underside paler than above, the hindwing pale buff. Forewing with six grey-white marginal spots and stripes in 2—7, the apical stripes larger than on the upperside, those in 4—7 proximally pointed, the one in 6 longer than the others. Those in 2—6 bear each a fuscous dot, forming an indistinct line dividing them at the middle. The ochraceous area reaches the margin between vein 2 and tornus, as in *trimeni*. Costal margin pale buff. Hindwing with the proximal spots as in typical form. Post-discal dots in 4—6. The edge of the proximal area is incurved between the veins, and therefore toothed at the veins. The grey-white submarginal spots are laarger than in *aliciae*, but not so large as in *trimeni*. The antemarginal spots pale buff. Cilia grey-white, fuscous-brown at the veins as in *trimeni*.

The palpi and legs earth-brown, not black as in *aliciae*. Abdomen with complete ventral row of white spots as in typical form.

Length of forewing, 25 mm. Expanse, 56 mm.

In *trimeni* (type ♀) the length of forewing is 26·5 mm., and expanse is 57 mm.

*Hab.*—KATANGA : Lufira River, near Likasi Copper Mine, 4,000 feet, 30.x.1918, 1 ♀ (*T. A. Barns*). In the B.M. (*Coll. Joicey*).

### 3. *Mimacraea neurata fulvaria* Auriv.

### f. **incurvata** forma nov.

♂. A narrow-banded form resembling *alciopina* Joic. and Talb. (1924), but the band of the forewing still narrower. The spots in 2 and 3 are strongly incurved on the distal edge, the inner edge being excurved. There is a similarly coloured proximal area connected to the band below vein 2, forming also a streak along lower margin of cell; it is distally blackish between veins 2 and 5, and is invaded by a black basal stripe below the cell. Hindwing almost entirely fulvous-brown, this colour merging into the fuscous marginal border.

Underside of forewing with the proximal fulvous merged with the lower part of the band to form a large median patch. Hindwing as in the allied forms.

♀. Upperside with paler fulvous band which is anteriorly wider; the posterior spots shaped as in the ♂. No proximal fulvous area. Hindwing as in the ♂, but the fulvous area less extended between veins 3 and the apex.

*Hab.*—NIGERIA : Ogruga, 1 ♂, 1 ♀. In B.M.

### 4. *Mimacraea neurata fulvaria* Auriv.

### ♀ f. **lineata** forma nov.

The band of the forewing is very narrow, at vein 2 only 1 mm. wide. The anterior part of the band is, as usual, narrower than the posterior part, and in this form it is not curved and is only faintly indicated between veins 4 and 5. The two posterior spots are distally incurved. There is some slight proximal fulvous scaling on the veins and inner margin, and a black discocellular mark. Hindwing with narrow discal fulvous band entering the cell and extending slightly along the veins. Underside like the preceding form.

*Hab.*—NIGERIA : Lagos, 2 ♀ ♀ (*C. Strachan*). In B.M.

### 5. **Virachola jacksoni** sp. nov.

(Plate IV. Fig. 2 (upper side), Fig. 3 (under side).)

This species is allied to *kafuensis* Neave and to *catori* B.-Bkr., both formerly referred to *Deudorix*. It is nearest the latter species, which does not possess a hair-pencil upon the hindwing above.

♂. Upperside sky-blue with black apical area on the forewing. This area includes the costa, extends to end of cell, to half of cellule 3 and a third of 2, and narrows to a point on the submedian. Hindwing very finely edged with black. The mealy patch is buff-colour upon a greenish area. At the base of cellule 7, between vein 8 and the cell, is a triangular patch of thickened membrane with a depressed centre and bare of scales. Inner margin greyish-white. Anal lobe bright orange-red on a white ground. Tail black. Cilia black on the forewing, on the hindwing black mixed with white.

Underside stone-grey, marked as in the two allied species. Forewing with very narrow, curved, post-discal line, dark brown and lightly scaled with yellow. There is a very faint submarginal line. Costal edge narrowly yellow, wider for the basal third. This character occurs also in *kafuensis*, but not in *catori*. Hair-pencil black. Hindwing with the post-discal line a little heavier, more strongly yellow than on the forewing, separated into spots by the veins, fairly straight from costa to vein 2, thence directed to the inner margin. A faint submarginal line. Anal lobe brick-red, with some bluish scaling. In cellule 2 a rounded black submarginal spot and a yellow patch between it and the submarginal line.

Antennae, palpi, frons, legs and abdomen as in the two allied species. The frons is white, the first and second segments of palpi white, third segment black.

♀. Upperside with paler blue areas. Forewing with wider black area. Hindwing with the blue area limited by veins 1*b* and 5, but some blue scaling in cellule 5. Three or four elongate black submarginal spots. Underside as in the ♂, but the yellow costa of forewing is strongly marked.

Length of forewing: ♂, 14 mm.; ♀, 16 mm.

Expanse: ♂, 31 mm.; ♀, 34 mm.

*Hab.*—UGANDA: Entebbe, 1905 (*E. A. Minchin*), 1 ♂ in B.M. (type). KENYA: Trans Nzoia, August, 1933, 1 ♀ (*T. H. E. Jackson*) (allotype, in Hope Dept.).

### 6. *Epamera tajoraca haemus* Talb. ♀.

(Plate IV. Fig. 1.)

♂, Talb., Ent. Mo. Mag. **71**: 118, May, 1935.

♀. Upperside resembles the ♂. The blue area of forewing slightly more extended above vein 2. Hindwing with the dark outer margin wider between veins 3 and 5, and the submarginal black spots larger. Underside markings as in the ♂.

Length of forewing, 16 mm. Expanse, 36 mm.

Allotype from Mt. Elgon, October, 1933. Also a ♂ from the same place, November, 1933. Both collected by T. H. E. Jackson.

### 7. *Chloroselas pseudozeritis tytleri* Rly.

### f. **umbrosa** forma nov.

(Plate IV. Figs. 4, 5, 7, 8.)

♂ ♀. Very close to the nymotypical form, of which *tytleri* appears to be a dry phase. Upperside of forewing with slightly more extended blue area, especially in the ♀.

Underside scarcely different from *pseudozeritis*, rather variable, with heavy or paler markings. The Elgon specimens are heavily darkened on the hindwing and have a whitish distal area on the forewing.

*Hab.*—KENYA: Mt. Elgon, November, 1932, 1 ♂; id., April, 1933, 1 ♀ (♂ ♀ types), both taken by T. H. E. Jackson. Also in the B.M. from Mumias, Kisumu Road, 3,800—4,800 feet, June 25-26, 1911, 1 ♂ (*S. A. Neave*); Upper Kuja Valley, S. Kavirondo, 4,200 feet, May 5-8, 1911, 1 ♂ (*S. A. Neave*).

### 8. *Lycaenesthes ituria* B.-Bkr. ♀.

(Plate IV. Fig. 6.)

♂, Bethune-Baker, Trans. Ent. Soc., p. 22, pl. I, fig. 4 (1910).

Resembles *rubricincta* Holl. on the upperside, but the yellow patch varies between veins 2 and 4 from 1.5 mm. to 3 mm. in width. The marginal black dots are smaller than in the figure given in Seitz' Macrolep. XIII, t. 72*a*. The spot in 2 is larger than the others, the two in 1*c* are larger than the ones in 3—5. There is a fine white line edging the black terminal line; this white line is not mentioned in respect of *rubricincta*. The underside resembles the ♂.

Length of forewing, 12—13 mm. Expanse, 26—28 mm.

Neallotype from UGANDA: Bunyoro, Budongo Forest, 1934, one specimen taken by T. H. E. Jackson. Also 1 ♂ from the Bugoma Forest in Bunyoro, October, 1932, taken by the same collector.

In the B.M. (*ex Coll. Joicey*).—Upper Ituri Valley, 30 miles south of Irumu, 3,000 feet, July, 1924, in tropical forest, 1 ♀. Itoa River, Ituri Forest, January, 1920, 1 ♀. Both taken by T. A. Barns.

The species shows variation in the shade of ground-colour below, and also in the more proximal (typical) or more distal position of the discal spots of the hindwing.

### 9. *Lycaenesthes hodsoni* Talb. ♀.

(Plate IV. Fig. 10 (upper surface), Fig. 11 (under surface).)

♂, Talbot, Ent. Mo. Mag. **71**: 125-6, June, 1935.

Much larger than the ♀ of *otacilia* Trim., to which the ♂ seems allied. Upperside ground-colour pale brown, as in *otacilia*. Forewing with large pale blue area from the base to beyond the cell, leaving a distal marginal border of ground-colour about 3 mm. wide, but wider at the apex. Hindwing with smaller pale blue area extending over the cell, the basal half of cellule 1c and basal two-thirds of 2 and 3; otherwise as in the ♂.

Underside as in the ♂, the hindwing darker.

Length of forewing, 19 mm. Expanse, 42 mm.

Allotype from Karamoja, Northern Uganda, June, 1934, one specimen (*T. H. E. Jackson*).

### 10. *Lycaenesthes levis* Hew. **grisea** subsp. nov.

(Plate IV. Figs. 9, 14, 15.)

This race, with grey underside, is distributed from the Cameroons to Uganda.

♂. Upperside of forewing with slightly extended blue streak. A large rounded discal patch, blackish-brown. Hindwing with slightly extended blue area.

Underside grey, the spots smaller, outlined with grey-white. On hindwing the apical spots in 6 and 7 form a grey-white patch. Anal spots with only a trace of yellow edging.

♀. Upperside dark grey. Forewing with a faint, pale submarginal line. Hindwing with grey-white post-discal line and black marginal spots edged with grey-white as in allied species.

Underside as in the ♂. The grey-white edging to the spots much heavier, the hindwing being grey-white with spots of pale or blackish-brown. Anal spots with yellow proximal border.

*Hab.*—UGANDA: Budongo, August to September, 1934, 2 ♂♂, 3 ♀♀ (types); Bunyoro, Budongo Forest, 1934, 1 ♂, 1 ♀. All collected by T. H. E. Jackson. Also in B.M. (*Coll. Joicey*) from Cameroons and Congo.

### 11. **Lycaenesthes sobrina** sp. nov.

(Plate IV. Fig. 12 (upper surface), Fig. 13 (under surface).)

This insect appears to be allied to *crawshayi* Butl., and as this is a rather variable species, we may have to do with an unusually distinct variation of it.

♀. Smaller than *crawshayi*. Upperside fuscous-brown, darker at the base, and without any blue scaling. Forewing with a pale submarginal line. Hindwing with dark marginal spots, edged with white. The spot in 2 black, larger than the others, which, excepting the anal spot, are not prominent.

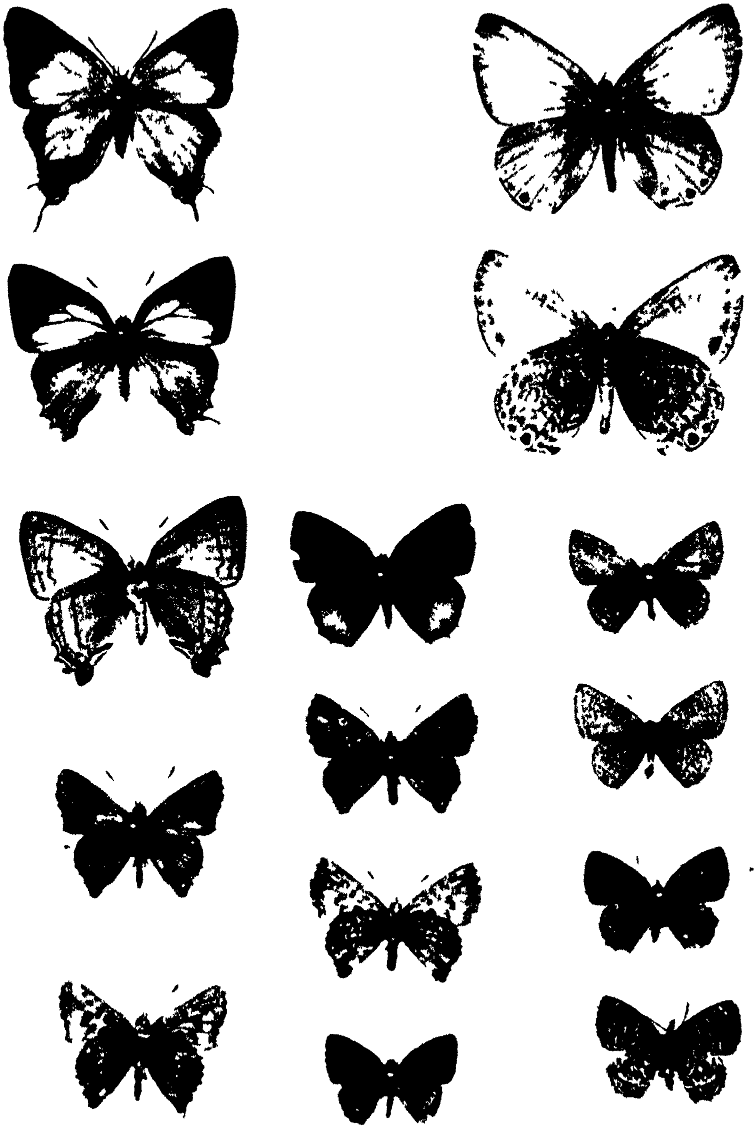
Underside dull greyish-brown, the spots outlined by white and not darker than the ground. Markings as in *crawshayi*, the spots smaller and the bands more separated. The black marginal spots in 1c and 2 of hindwing show only slight yellow edgings and sparse green scaling.

Length of forewing, 11.5 mm. Expanse, 25 mm.

*Hab.*—W. KENYA COLONY, 3,000 ft., leading into Kerio Valley. Suk, April, 1934, 1 ♀ (*T. H. E. Jackson*).

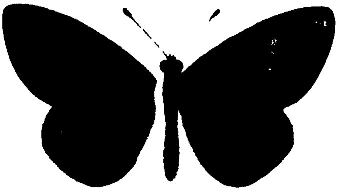
PLATE IV.

Ent. Mo. Mag., 1935



NEW AFRICAN LYCAENIDAE.

PLATE V.



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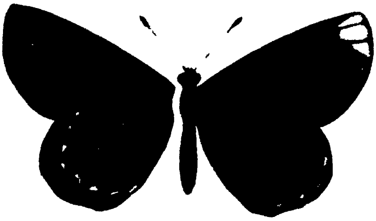

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COOKSONIA ALICIAE sp. nov.

H. Eltringham pinxit
1935

## EXPLANATION OF PLATES.

### Plate IV.

FIG. 1. *Epamera tajoraca haemus* Talb. ♀ Neallotype. Mt. Elgon, south-eastern slopes, 18 miles south-west of Kitale, 6,700 feet; October, 1933. T. H. E. Jackson.
,, 2. *Virachola jacksoni* sp.nov. ♀ Allotype. Kenya Colony, Trans Nzoia; August, 1933. T. H. E. Jackson.
,, 3. As 2. Under surface. Tail of hind wing broken off.
,, 4. *Chloroselas pseudozeritis tytleri* Rly., f. *umbrosa* forma nova. ♂ Type. Locality, etc., as for 1. November, 1932.
,, 5. As 4. Under surface.
,, 6. *Lycaenesthes ituria* B-Bkr. ♀ Neallotype. Uganda, Bunyoro, Budongo forest; September, 1934. T. H. E. Jackson.
,, 7. *Chloroselas pseudozeritis tytleri* Rly., f. *umbrosa* forma nova. ♀ Allotype. Locality, etc., as for 1. April, 1933.
,, 8. As 7. Under surface.
,, 9. *Lycaenesthes levis* Hew. subsp. nov. *grisea*. ♂ Type. Locality, etc., as for 6. August—September, 1934.
,, 10. *Lycaenesthes hodsoni* Talb. ♀ Allotype. Northern Uganda, Karamoja; June, 1934. T. H. E. Jackson.
,, 11. As 10. Under surface.
,, 12. *Lycaenesthes sobrina* sp.nov. ♀ Holotype. W. Kenya Colony. 3,000 feet, leading into Kerio Valley; Suk, April, 1934. T. H. E. Jackson.
,, 13. As 12. Under surface.
,, 14. *Lycaenesthes levis* Hew. subsp. nov. *grisea*. ♀ Allotype. Data as for 9.
,, 15. As 14. Under surface.

### Plate V.

Fig. 1. *Cooksonia aliciae*, sp. nov. Type ♂. Bred 21.xi.1931 by Dr. W. A. Lamborn from larva on tree trunk. Maiwale, 12 miles east of Fort Johnston, Nyasaland. 3280 feet. Rather thick bush.

Fig. 2. *C. aliciae*. ♀ allotype. Bred 27.xi.32. Other data as for 1.

Fig. 3. Empty pupa skin of a male from same locality.

Specimens in Hope Department, Oxford University Museum.

*July*, 1935.

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*The species of Bembidion in the Stephens Collection* (*ante, pp.* 131-135).—The detailed examination of these by Dr. Netolitsky, who has done so much work on this family of Coleoptera, is of the greatest interest. It is somewhat unfortunate that a comparison has been made with Waterhouse's Catalogue of 1861 (not 1858. The Adephaga and Brachelytra only were published in that year) instead of Dawson's 'Geodephaga Britannica' (1851) which was based on 'a careful examination and comparison of the various species contained in all the public and private collections to which I could gain access, especially to those of Messrs. Curtis and Stephens, those of the British Museum, of the Linnaean Society, and the Kirbian collections of the Entomological Society.' Dawson made corrections of his work and replied to criticims in an article in the Entomologists' Annual for 1858. Waterhouse merely registered the conclusions at which Dawson had arrived, in the works named the latter gave the reasons on which his conclusions were based. In the main, as Dr. Blair points out, Dr. Netolitsky's determinations agree with Mr. Dawson's conclusions, and the few differences are more apparent than real. One point that emerges from this comparison, is that in the more than eighty years that have elapsed since Dawson examined it, Stephens' collection has not suffered from any meddling interference, but remains pretty much as he left it. The points of major differences marked with an asterisk (*) or square brackets [ ] are worthy of a little more than a passing notice. ***Peryphus fellmanni*** and ***Lophia nana*** were quite properly ignored by Dawson because 'No example' existed 'in any British collection to represent' them. Of the former he remarks 'the insect described by Stephens as ***Fellmanni*** probably belongs to this species [***prasinum***], but there are no examples in the Stephensian cabinet to represent it,' and of the latter 'Whether ***Lopha nana*** Steph. is to be referred as a small variety to this species (*pusillum* Gyll = [*minimum*]). I cannot determine, as that name has no representative in the Stephensian cabinet.' ***Peryphus tetraspilotus*** Rudd, of which there is now no example, must have had one in Dawson's time, for he definitely places it with *littorale* Ol. (=*ustulatum* L.).

*Tachys maritimus* Ste., Man., p. 52 omitted from the list = *T. bistriatus* Deft., *Peryphus concinnus* Kirby. Dawson says 'The individuals placed under this name in the Kirbian collection perfectly correspond with the species here described' (*i.e. B. concinnus* Putz) *with which also Stephens's descriptions correspond,* though the supposed examples in his cabinet must be referred to *femoratrum.*

*Peryphus maritimus* Rudd. Dawson states that in the Stephensian collection this is represented by examples of *femoratum* mixed up with others of *littorale.* As only three specimens are there now, it would appear that some diminution in number has taken place since Dawson's time. He continues 'I have examined the single example of *P. maritimus* in the late Mr Rudd's collection (now in the Museum of the York Philosophical Institution) and find that it is a somewhat aberrant individual with the thorax rather greener. I therefore give *maritimus* as synonymous with *B. femoratum.*' In both these cases the apparent contradiction is really an agreement with Dr. Nebolitsky's examination.

The same remark applies to *Peryphus agilis* Spence 'though represented in the Stephensian cabinet by specimens of *decorum* [confirmed by Dr. Netolitsky] is identical with *B. monticulum,* as proved by the examples in the collection of the Entomological Society, as well as in that of Mr. Curtis.' The one outstanding difference concerns *Peryphus viridiaeneus* and *P. albipes,* both of which Dawson unhesitatingly placed under *decorum* Panz, the single specimen of *albipes* he cites as immature. These are now determined by Dr. Nebolilsky, the former as *B. tibiale,* and the latter as *atroviolaceum.*

E. C. Rye often pointed out that although Stephens gave a correct description of a species, the specimens standing under that name in his cabinet were wrongly placed. Dawson found it so, and Dr. Netolitsky does the same. A striking instance is seen in *B. assimile* and *B. normannum.* Under the latter Dawson says 'The individuals standing under the names *Lopha pusilla, assimilis* and *haemorrhoidalis* in the *Stephensian* cabinet are (with one exception) perfectly identical with this species. Stephens appears to have transposed the species *L. assimilis* and *doris* (*normannum*) in his collection.'

It is remarkable that Dawson, who was the first to recognise and name *B. clarkii* in 1849, did not notice the three specimens now found under *spencii.* Instead he says '*Notaphus castanopterus* Steph. is a pale and immature variety of the insect *jassimile*) from which *Lopha spencii* and *doris* of the Stephensian cabinet do not differ.' At the present day only two specimens stand under *monticulus;* in Dawson's time there were four.—E. G. **Bayford**, 38 Elton Street, Barnsley: *July 15th, 1935.*

*Philonthus rectangulus Sharp in Yorkshire.*—This species has been taken in Yorkshire during the present year by Mr. H. Britten, junr., at Whitby (March and April, 1935). It occurred by riddling stable-manure and was fairly plentiful, the sexes being in about equal numbers.—W. J. **Fordham**, Barmby Moor, York: *August 7th, 1935.*

*'A Seaside Beetle in London.'*—At the beginning of July, my daughter, R. M. Haines, sent me a specimen of *Anoncodes melanura* L., found by her on June 30th, in Holland Road, Kensington, W.14. She tells me that in such building as was going on near by, metal, and not wood, was being used. The various occurrences noted on almost similar dates might suggest a migratory movement, under some peculiar influence affecting this particular species. Different species are doubtless impelled by different stimuli. Other records would be of interest.—F. H. **Haines**, Appleslade, Ringwood, Hants: August 9th, 1935.

*A Fly developing at a constantly very low Temperature.*—Dr. G. S. Graham Smith (Observations on the Habits and Parasites of Common Flies, Journ. of Parasitology, Vol. VIII, No. 4, June 30th, 1916, pp. 452-455) found that the majority of blowflies emerged when the mean temperature two inches below the surface of the ground reached 48°F. (8.8°C.) and remained above that level, but that 'walkers' were seen when the maximum temperatures on the ground were 51°F., 48°F., 49°F., 47°F., and 43°F. (=10.6°C., 9.4°C., 8.3°C., and 6.2°C.).

It is, therefore, interesting to note that of a balance of 276 pupae of the blowfly (*Calliphora erythrocephala*) left over from another experiment and left in a room at the Low Temperature Station in which the mean temperature from June 23rd, 1923, to January 21st, 1934, was 5.02°C. or 41.04°F., a number completed their development.

106 had emerged and died; 93 had half emerged from their puparia and then died or had fully developed and died within their puparia; whilst 76 pupae had putrified and either dried up or liquified; one puparia contained a white, fairly fresh though dead pupa.

The temperature of the room in which the pupae were kept was supposed to remain at 5°C. Actually it fluctuated on certain occasions—chiefly when work was done in the room. The total period during which the pupae were kept in this low temperature room was 212 days. The mean temperature during this period was 5.02°C. or 41.04°F.; the highest temperature recorded was 6.5°C. or 43.7°F.; the lowest temperature recorded 4.8°C. or 40.64°F. The temperature fluctuated on 66 days (22 days below and 44 days above 5°C.), and remained at 5°C. on 146 days. The mean temperature below 5°C. (41°F.) was 4.88°C. (40.78°F.) for approximately 372 hours; the mean temperature above 5°C. was 5.25°C. (41.54°F.) for approximately 538 hours.—J. E. M. **Mellor**, Alpha Cottage, Trumpington, Cambridge: *August 10th, 1935.*

## Reviews

'The Two Roads of Papua.' By Evelyn Cheesman, F.R.E.S., F.Z.S. Large Demy 8vo, pp. 282. London: Jarrolds Limited, 34 Paternoster Row, E.C.4. 1935. Price 18/-.

Since Miss Cheesman, more than ten years ago, made her first visit to the

Pacific as one of the scientific staff of the yacht *St. George*, she has given us more than one work of high interest and value dealing with the native as well as with the insect life of the remote and still imperfectly known island groups of this great Ocean. The brightly written book now under notice is the outcome of a year's entomological research in Papua, the name by which the south-eastern extension of the great island of New Guinea under British control is now officially known. As far as was possible under the existing conditions of travel and collecting in this exceptionally difficult tropical region, Miss Cheesman was commissioned by the Natural History Museum at South Kensington to investigate the insect fauna of the Owen Stanley Mountains, backbone of Papua. With the exception of the butterflies and the more conspicuous beetles, the insects of this region were practically unknown, and thus her attention was mainly directed to the more or less unworked Orders, and more especially to the Hymenoptera. Access to these mountains is gained by two fairly practicable roads or tracks from Buna (reached by aeroplane) and from Port Moresby, on the east and west coasts of the Territory respectively, and both these roads were traversed by Miss Cheesman to their termination. Although unable to ascend to any of the actual mountain summits, she obtained a large amount of valuable and interesting material in the weird moss-choked rain-forests of the higher ranges—no fewer than 744 moths having been taken at the light-screen in one evening on Mount Tafa—as well as in the foothills at a lesser elevation. Graphic descriptions are given of the habits of many of the insects, and of the methods of collecting appropriate to the special conditions of the country and the climate. But the real charm of the book is to be found in the relation of the 'incidents of travel'—detention of supplies, the vagaries of the native carriers, appalling mountain and forest tracks, insect pests, tropical rainstorms, alarming landslips, and worst of all, frequent bouts of the terrible New Guinea malaria —all these troubles being met by this intrepid lady with steadfast courage and genial humour not unworthy of Ulysses himself.

The numerous photographic illustrations give an excellent idea of the natural features and conditions of the region, though some of them are too small a scale to be really effective; and an index, which would have been helpful, is lacking. But very few books have been read by us in recent years with greater enjoyment than this vivid narrative of Entomological travel in one of the wildest regions of the earth.—J.J.W.

'THE MACROLEPIDOPTERA OF THE WORLD.' Edited by Dr. Adalbert Seitz. I. Section. Fauna Palaearctica. Supplement. Parts 53-57. 3 Plates. Stuttgardt: Alfred Kernen, Publisher. 1935.

Two of these five parts of Dr. Seitz's monumental work deal with the Palaearctic Noctuae (Dr. M. Draudt), and the other three, with with Volume IV of the Palaearctic Supplement commences, are devoted to the Geometrina (L. B. Prout). The three plates of new and rare forms of this section present the texture and markings of these delicate moths with a fidelity and artistic finish unsurpassed by any figures which have yet appeared in the entire work.

## Obituary.

*Charles Ernest Stott* died at his residence 'The Mount,' Armitage, Staffordshire, on May 28th last after a rather long illness. He was the youngest son of Mr. James Stott of Basford Hall, Stoke-on-Trent, and was born in Manchester on September 18th, 1868. He was interested in Entomology from boyhood, first as a Lepidopterist and later as a Coleopterist. In 1915 he became a Fellow of the Royal Entomological Society, and was also a member of the North Staffordshire Field Club .

Mr. Stott commenced his business career in Manchester, but in 1914 was transferred to London as Continental Traffic Manager for the Lancashire and Yorkshire Railway Company and the Goole Steamship Company, later merged with the London, Midland and Scottish Railway; until his retirement in 1927 he resided at Reigate. He took an active interest in local affairs and also was interested in politics, becoming a member of the Lichfield Division Executive Committee. He was also a past President and Chairman of the Kings Bromley and District Horticultural Society, and as a Freemason was an initiate of the oldest Provincial Lodge in the Kingdom.

Mr. Stott contributed various notes to this Magazine, the most recent being in December last. He was well known to British Coleopterists, and had the good fortune to rediscover *Cryptocephalus decemmaculatus* L. at Chartley Moss, after a lapse of nearly sixty years since the last specimens were taken there.

Mr. Stott leaves a widow, two sons, two daughters, and a wide circle of friends to mourn his passing.

## Society.

ENTOMOLOGICAL CLUB.—The last meeting of the Entomological Club for the 1934 session was held at Chantry Lodge, Longdown, Guildford on May 18th, 1935, Mr. W. J. Kaye in the Chair.

Members present in addition to the Chairman: Sir Edward B. Poulton, F.R.S., Mr. H. Willoughby Ellis, Mr. J. E. Collin, Dr. Harry Eltringham, F.R.S. Visitors present: Mr. F. W. Frohawk, Mr. Russell James, Dr. Karl Jordan, F.R.S., Mr. Frank A. Oldaker, Mr. N. D. Riley, Mr. J. A. Simes, Mr. W. Rait-Smith.

The guests were received by Mr., Mrs. and the Misses Kaye at 12.30 in the morning and luncheon was served at 1 o'clock, after which Mr. J. E. Collin exhibited a series of ten specimens of a rare British Syrphid (*Chilosia chrysocoma* Mg.) from Cothill, near Oxford. Previous to the species being found in this locality by Mr. E. Rivenhall Goffe in 1932, only single specimens had been recorded from Selsley and Painswick in Gloucestershire, Tarrington in Herefordshire, and Nethy Bridge (Inverness-shire). The species is far from common at Cothill, the specimens exhibited being the result of three days' collecting in 1934 and five days' collecting in the present year, on both occasions early in May. It has a fairly wide range of distribution in Northern and Central Europe, but its life-history is unknown. Males and females were exhibited.

After luncheon the guests inspected the gardens, including the greenhouses recently erected by Mr. Kaye to receive his large collection of orchids. The season was rather too early for the best show, but a number of beautiful orchids were in bloom and were much admired.

Chantry Lodge is situated on an eminence overlooking a beautiful valley, and on clear days very extensive views over the hills are obtained. During the afternoon the Chairman's collection of British and Foreign Lepidoptera were inspected, and amongst the latter the Sphingidae created much interest. After tea a walk along the hill-ridge, which afforded a fine view of the neighbourhood, was interrupted by rain and after returning to Chantry Lodge the members and visitors left about six o'clock after a most entertaining day.—H. WILLOUGHBY ELLIS, *Hon. Secretary*.

## THE PARASITES OF BRITISH BIRDS AND MAMMALS. IV.— RECORDS OF MAMMAL PARASITES.

BY GORDON B. THOMPSON
(Department of Entomology, British Museum (Nat. Hist.)).

As a result of my appeal for ectoparasites of our British birds and mammals I have already received some very interesting material. This note contains some records of the various mammal parasites together with their hosts. I am extremely grateful to the numerous collectors, whose names will be found bracketed with the locality of each host, for their kindness in sending me specimens.

For the determination of the mites I have to thank my friend Mr. H. Britten and for much kind help with the determination of the ticks I wish to thank Mr. C. Warburton. To Dr. S. Finnegan my thanks are due for her kindness in helping with the Acarina.

### SIPHUNCULATA.

Haematopinidae.

*Enderleinellus longiceps* Kellogg & Ferris, 1915.

Males and females from *Sciurus carolinensis* Gmelin (Grey Squirrel), adult ♂, Surrey, Wormley Hill, 4.vi.1934, (*N.H. Bennett*).

*Neophaematopinus sciurinus* (Mjöberg), 1910.

Males and females from *S. carolinensis* Gmelin, Kent, Hildenborough, 4.iv.1931, (*G. B. Thompson*).

Males and females from *S. carolinensis* Gmelin, adult ♂, Surrey, Wormley Hill, 4.vi.1934, (*N. H. Bennett*).

Males and females from *S. carolinensis* Gmelin, adult ♀, Gloucester, nr. Cheltenham, Puckham Woods, 7.ix.1934, (*J. N. Taylor*).

In 1934 I recorded this species for the first time from a British example of the Grey Squirrel. It appears from the above records to occur commonly on this host.

*Hoplopleura sciuricola* Ferris, 1921.

Contrib. toward a Mon. Sucking Lice, iii, pp. 110-111, figs. 69-70.

Males and females from *S. carolinensis* Gmelin, adult ♂, Surrey, Wormley Hill, 4.vi.1934, (*N. H. Bennett*).

This constitutes a new British record, the species having only been recorded previously from a N. American example of the Grey Squirrel. Moreover, this record, together with the two previous ones, are of particular interest as all three species were collected from a single specimen of the host.

## MALLOPHAGA.

Trichodectidae.

*Trichodectes melis* (Fabricius), 1805.

Males and females from *Meles meles meles* Linn. (Badger), adult ♀, Oxford, University grounds, 18.ix.1933, (rec'd from *R. Taylor*).

Males and females from *M. m. meles* Linn.,* Ireland, Co. Derry, Ballykelly Wood, iii.1934, (*S. A. Hunter*).

*Trichodectes mustelae* (Schrank), 1803.

Males and females from *Mustela nivalis nivalis* Linn. (Weasel), Kent, Woolwich, 11.v.1933, (*T. E. Potter*).

## SIPHONAPTERA.

Pulicidae.

*Archaeopsylla erinacei* (Bouché), 1835.

Males and females from *Erinaceus europaeus* Linn. (Hedgehog), from the following localities :—

Devon, Uffcolme, vii.1934, (*F. F. Laidlaw*); adult ♂, Ireland, Co. Dublin, St. Annes Clontarf, 7.iii.1925, (*E. O'Mahony*); Glamorgan, Penylan, 10.v.1934, (*H. M. Hallett*); Kent, Sidcup, vii.1934, (*G. B. Thompson*); Kent, Eltham, 30.vi.1932, (*G. B. Thompson*); Oxon, N. Oxford Golf Course, 27.viii.1934, (*D. H. S. Davis*).

This flea is specific to the Hedgehog, on which it usually occurs in very large numbers.

Ceratophyllidae.

*Nosopsyllus fasciatus* (Bosc.), 1800.

One female from *M. n. nivalis* Linn., Glamorgan, nr. Cefu Mabley, 11.v.1934, (*H. M. Hallett*).

Three females from *M. n. nivalis* Linn., Kent, Woolwich, 11.vi.1933, (*T. E. Potter*).

*Monopsyllus sciurorum* (Schrank), 1803.

Four females and three males from *S. carolinensis* Gmelin, adult ♂, Surrey, Wormley Hill, 4.vi.1934, (*N. H. Bennett*).

One female from *S. carolinensis* Gmelin, adult ♀, Gloucester, nr. Cheltenham, Cleeve Hill, 18.ix.1934, (*J. N. Taylor*).

Two males and one female from *Sciurus vulgaris leucorus* Kerr (Red Squirrel), adult ♂, Radnor, Boughrood, 16.ix.1934, (*J. G. Williams*).

*Orchopeas wichami* (Baker), 1895.

One female from *S. carolinensis* Gmelin, Surrey, Wormley Hill, 4.vi.1934, (*N. H. Bennett*).

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* These specimens have already been recorded by J. A. Sidney Stendall, Irish Nat., 1934, v. p. 72.

I have remarked previously (1934) on the apparent scarcity of this specific flea of the Grey Squirrel. According to Shaftesbury (1934), *O. wickhami* (Baker) is very common on the Grey Squirrel in North Carolina, U.S.A., and females predominate.

*Paraceras melis* (Walker), 1856.

One female from *M. m. meles* Linn.,† Ireland, Co. Derry, Ballykelly Wood, iii.1934, (*S. A. Hunter*).

Two females from the same host species, adult ♀, Oxford, University Grounds, 18.ix.1933, (rec'd from *E. Taylor*).

*Ctenophthalmus agyrtes celticus* Jordan & Rothschild, 1922.

A male and a female from *Apodemus sylvaticus sylvaticus* (Linn.) (Long-tailed Field Mouse), Ireland, Co. Dublin, Kilbarrack, 11.xi.1925, (*E. O'Mahony*).

Six males and four females from the same host species, Ireland, Co. Dublin, Sutton, 1.xii.1925, (*E. O'Mahony*).

Two females and a male from *Clethrionomys glareolus britannicus* (Miller) (Bank Vole), Gloucester, nr. Cheltenham, Prestbury, 26.viii.1934, (*J. N. Taylor*).

According to Jordan and Rothschild (1922) the true *Ctenophthalmus agyrtes* Heller does not occur in the British Isles but is represented by the subspecies *celticus*, which differs ' in the ♂ in the lower process of the clasper having the ventral apical angle square, and in the ventral arm of the ninth sternite being much less widened in its distal half than in Central European examples. In the ♀ the seventh abdominal sternite bears below the large lateral lobe a narrow, more or less acuminate and prominent lobe, which is always longer than it is broad in the centre.'

*Ctenophthalmus bisoctodentatus* Kolenati, 1863.

Three males and two females from *Talpa europaea* Linn. (Mole), adult ♂, Gloucester, nr. Cheltenham, Noverton, 3.viii.1934, (*J. N. Taylor*).

Leptopsyllidae.

*Leptopsylla musculi* (Dugès), 1832.

Five females and one male from *Mus musculus* Linn. (House Mouse), Ireland, National Museum, Dublin, 21.x.1932, (*E. O'Mahony*).

Hystrichopsyllidae.

*Typhloceras poppei* Wagner, 1903.

One female from *A. s. sylvaticus* (Linn.), Ireland, Co. Dublin, Kilbarrack, 11.xi.1925, (*E. O'Mahony*).

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† See previous footnote on the parasites from this host and locality.

This flea was first recorded from England by Rothschild (1903). It does not, however, occur commonly in the British Isles. According to Rothschild (1915) it has been found in Ireland.

*Hystrichopsylla talpae* (Curtis), 1826.

One female from *M. musculus* Linn., Ireland, Co. Dublin, Sutton, 29.xii.1924, (*E. O'Mahony*).

One female from *A. s. sylvaticus* (Linn.), Ireland, Co. Dublin, St. Anne's, Clontarf, 25.x.1924, (*E. O'Mahony*).

Ixodidae.

### IXODOIDEA.

*Ixodes hexagonus* Leach, 1815.

One female and one nymph from *Mustela hibernica* Thomas & Barrett-Hamilton (Irish Stoat), Co. Dublin, Kilbarrack, iv.1926, (*E. O'Mahony*).

One female from *Lutra lutra* (Linn.) (Otter), Monmouthshire, Marshfield, 20.vii.1934, (rec'd from *H. M. Hallett*).

Females, larvae and nymphs from *Mustela putorius putorius* Linn. (Polecat), Carmarthenshire, Llangadoe, 10.xi.1932, (rec'd from *H. M. Hallett*).

Forty-three females from *E. europaeus* Linn., Oxon, N. Oxford Golf Course, 27.viii.1934, (*D. H. S. Davis*).

Nine females from *E. europaeus* Linn., Oxon, Witney, 28.viii. 1934, (*H. V. Corley*).

One female from *E. europaeus* Linn., Oxon, N. Oxford, 30.viii.1934, (*D. H. S. Davis*).

This last specimen of *I. hexagonus* Leach was taken from a hedgehog kept in captivity after all the ticks had been removed from it at the time of capture. It is of interest to note the extent to which hedgehogs serve as hosts for this species of tick.

*Ixodes tenuirostris* Neumann, 1901.

One nymph and three larvae from *C. g. britannicus* (Miller), three adult ♂♂, Gloucester, nr. Cheltenham, Prestbury, 26.viii.1934, (*J. N. Taylor*).

Two males and three females from *A. s. sylvaticus* (Linn.), Oxon, Bagley Wood, 17.v.1934, (*D. H. S. Davis*).

The specimens from the Long-tailed Field Mouse are of particular interest, as I believe the males of this species of tick are seldom found.

### PARASITOIDEA.

*Eulaelaps stabularus* (C. L. Koch), 1840.

One specimen from *A. s. sylvaticus* (Linn.), Ireland, Co. Dublin, Kilbarrack, 11.xi.1925, (*E. O'Mahony*).

Two specimens from *T. europaea* Linn., adult ♂, Gloucester, nr. Cheltenham, Noverton, 3.viii.1934, (*J. N. Taylor*).

Specimens from *S. carolinensis* Gmelin, Kent, Hildenborough, 4.iv.1931, (*G. B. Thompson*).

Specimens from *C. g. brittanicus* (Miller), three adult ♂♂, Gloucester, nr. Cheltenham, Prestbury, 26.viii.1934, (*J. N. Taylor*).

*Laelaps festinus* (C. L. Koch), 1839.

Two specimens from *A. s. sylvaticus* (Linn.), Ireland, Co. Dublin, Sutton, 1.xii.1925, (*E. O'Mahony*).

*Haemogamasus hirsutus* Berlese, 1889.

Specimen from *A. s. sylvaticus* (Linn.), Gloucester, nr. Cheltenham, Prestbury, 28.viii.1934, (*J. N. Taylor*).

Specimens from *C. g. brittanicus* (Miller), three adult ♂♂, Gloucester, nr. Cheltenham, Prestbury, 26.viii.1934, (*J. N. Taylor*).

## SUMMARY OF THE RECORDS.

| HOST. | | PARASITE. |
|---|---|---|
| *Sciurus carolinensis* Gmelin. | (S) | *Enderleinellus longiceps* Kellogg & Ferris. |
| ,, ,, ,, | (S) | *Neohaematopinus sciurinus* (Mjöberg). |
| ,, ,, ,, | (S) | *Hoplopleura sciuricola* Ferris. |
| ,, ,, ,, | (A) | *Monopsyllus sciurorum* (Schrank). |
| ,, ,, ,, | (A) | *Orchopeas wickhami* (Baker). |
| ,, ,, ,, | (P) | *Eulaelaps stabularus* (C. L. Koch). |
| *Sciurus vulgaris lencorus* Kerr. | (A) | *Monopsyllus sciurorum* (Schrank). |
| *Meles m. meles* Linn. | (M) | *Trichodectes melis* (Fabricius). |
| ,, ,, ,, | (A) | *Paraceras melis* (Walker). |
| *Mustela n. nivalis* Linn. | (M) | *Trichodectes mustelae* (Schrank). |
| ,, ,, ,, | (A) | *Nosopsyllus fasciatus* (Bosc.). |
| *Mustela hibernica* Thomas & Barrett-Hamilton. | (I) | *Ixodes hexagonus* Leach. |
| *Mustela p. putorius* L. | (I) | *Ixodes hexagonus* Leach. |
| *Lutra lutra* (Linn.). | (I) | *Ixodes hexagonus* Leach. |
| *Erinaceus europaeus* Linn. | (A) | *Archaeopsylla erinacei* (Bouché). |
| ,, ,, ,, | (I) | *Ixodes hexagonus* Leach. |
| *Apodemus s. sylvaticus* Linn. | (A) | *Ctenophthalmus agyrtes celticus* J. & R. |
| ,, ,, ,, | (A) | *Typhloceras poppei* Wagner. |
| ,, ,, ,, | (I) | *Ixodes tenuirostris* Neumann. |
| ,, ,, ,, | (P) | *Eulaelaps stabularus* (C. L. Koch). |
| ,, ,, ,, | (P) | *Laelaps festinus* (C. L. Koch). |
| ,, ,, ,, | (P) | *Haemogamasus hirsutus* Berlese. |
| *Clethrionomys glareolus brittanicus* (Miller). | (A) | *Ctenophthalmus agyrtes celticus* J. & R. |
| ,, ,, ,, | (I) | *Ixodes tenuirostris* Neumann. |
| ,, ,, ,, | (P) | *Eulaelaps stabularus* (C. L. Koch). |
| ,, ,, ,, | (P) | *Haemogamasus hirsutus* Berlese. |

| HOST. | PARASITE. |
|---|---|
| *Talpa europaea* Linn. | (A) *Ctenophthalmus bisoctodentatus* Kolenati. |
| ,, ,, ,, | (P) *Eulaelaps stabularus* (C. L. Koch). |
| *Mus musculus* Linn. | (A) *Leptopsylla musculi* (Dugès). |
| ,, ,, ,, | (A) *Hystrichopsylla talpae* (Curtis). |

(S) = Siphunculata. (A) = Siphonaptera. (I) = Ixodoidea. (P) = Parasitoidea. (M) = Mallophaga.

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British Museum (Natural History),
Cromwell Road, London, S.W.7.
*March 21st*, 1935.

# SYSTEMATIC NOTES UPON BRITISH AQUATIC COLEOPTERA.

BY FRANK BALFOUR-BROWNE, M.A. (OXON ET CANTAB.),
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## PART VIII. *RANTUS*.

The genus *Rantus* is attributed to Lacordaire (1835), who based it upon an unpublished paper by Eschscholtz, referred to by Dejean in later editions of his Catalogue, and as Lacordaire gave the first description of the genus, it is correctly credited to him, the name up to that time being a 'nomen nudum.' It is to be noted, however, that the genus described by him was *Rantus*, following Eschscholtz, and it was not until 1846 that Agassiz changed the spelling to *Rhantus*, which is correct according to the original Greek, but by the rules of nomenclature no such emendation can be accepted unless made by the original author and within the same volume of the publication in which the original spelling appeared.

Lacordaire makes out a determination table for the Dytiscidae in which the distinguishing generic characters are mainly differences in the anterior tarsi of the males, and one of the groups contains the genera *Cymatopterus* (the only species in which is what we now know as *Colymbetes fuscus*), *Rantus* and *Colymbetes* (the latter including *R. grapii* and the genera *Agabus*, *Platambus* and *Ilybius*, which were not separated until later). *Cymatopterus* and *Rantus* are separated from *Dytiscus*, *Acilius*, *Cybister* and *Hydaticus* by having the anterior tarsi of the males simply dilated instead of expanded into 'palettes,' and *Rantus* males have the basal segment possessing cupules, which are absent in *Cymatopterus*. The *Colymbetes* group, including *R. grapii*, are described as having the anterior tarsi simple in both sexes.

There may be a distinct gap between the tarsal expansion of the *Dytiscus-Hydaticus* group and that of *Cymatopterus-Rantus*, but there seems to me to be no justification for cutting off *grapii* from the other *Rantus* species on this character as, although the tarsal expansion of *R. exsoletus* and *notatus* is well marked, that of *adspersus* (Brit. auct.) and of *bistriatus* (Brit. auct.) is less so, while that of *pulverosus* is about the same, or even less than that of *grapii*.

Lacordaire's definition of the genus *Rantus* is not very enlightening, and is in fact confusing, since he includes in it two subgenera which are widely separated from one another, *Liopterus* and *Rantus*. These are only separated by him on the length of the anterior tarsal claws, which are described as equal in the former and unequal in the latter, *Liopterus* including two species, *R. oblongus* Illig. and *R. notatus* Fab., while *Rantus* has three species, *R. suturalis* Dej., *R. agilis* Fab. and *R. adspersus* Fab. The first of these species, *oblongus*, is our *Liopterus ruficollis* Schaller, but the second, whatever it may be, is not Fabricius' species. Zimmermann (1920) gives it as a synonym of *pulverosus*, but, in the first place, no one could possibly place that species in the same group as *L. ruficollis*, and in the second place *pulverosus* has unequal anterior tarsal claws. *R. suturalis* of Dejean's Catalogue is apparently *notatus* Fab., while *R. agilis* Fab. is ascribed by Zimmermann to *L. ruficollis*, which obviously it cannot be. Lacordaire's description of Fabricius' species suggests that it is the *bistriatus* of the British lists. It seems possible that *R. adspersus* is *R. exsoletus* Forst., since many of the earlier descriptions of *adspersus* fail to indicate any point upon which it would be possible to say the details were inapplicable to that species. Fabricius' description of *adspersus* (1801), including 'subtus niger, prosterno, pedibus abdominisque fasciis testaceis,' definitely refers to *adspersus* Brit. auct., but the *adspersus* of Illiger (1798) suits *exsoletus*, as does that of Panzer (1794).

Sharp uses none of the characters mentioned by Lacordaire, but, having separated out the Colymbetini (*Scutopterus, Rantus, Colymbetes* and *Meladema*), he divides them on characters which I have rearranged and modified in the following table :—

A. Side-pieces of fourth and following ventral segments comparatively broad, that of the fourth being only about twice as long as broad. Upper surface conspicuously reticulate .................................. *Scutopterus*.

**Side pieces of fourth and following ventral segments very narrow. Upper surface not reticulate ........................................................ B.**

**B. Posterior tarsi with terminal segment longer than penultimate ... *Meladema*.**

**Posterior tarsi with terminal segment not longer ................................ C.**

**C. Metasternal groove broad and definite. Elytra not transversely scratched. ............ *Rantus*.**

**Metasternal groove narrow and indistinct. Elytra usually transversely scratched or ' more rarely ' smooth .............................. *Colymbetes*.**

The British representatives of the modern genus *Rantus* are six in number, but one of them, as early as Dejean, was placed in a separate genus. As already mentioned, Lacordaire placed it in the large genus *Colymbetes*, and since then *grapii* has been isolated by several authors, *e.g.* by Thomson (1860), Seidlitz (1886), etc., as *Colymbetes*; by Zaitzev (1907) as *Nartus* and by Des Gozis (1910) as *Rantogiton.*

*Colymbetes,* as a genus, was created by Clairville in 1806, but that author not only gave certain characters for the identification of his genus but also gave a description of two 'representative' species, namely *C. striatus* and *C. fuscus*. How, in view of these facts, Lacordaire and other subsequent authors saw fit to use the name in a very different connection it is impossible to explain, but it is clear that if *grapii* were entitled to separation from the other species of *Rantus*, *Colymbetes* is not the name its genus should have. In Thomson's descriptions of the two genera *Colymbetes* and *Rantus* (l.c., pp. 50, 51) there are a few distinguishing characters which I have picked out and arranged in parallel columns :—

| | COLYMBETES. | RANTUS. |
|---|---|---|
| 1. | Anteriores [tarsi] unguiculis elongatis, maris articulis 3 primis compressiusculis, parum dilatatis. | Anteriores [tarsi] unguiculis saepissime valde elongatis, maris articulis 3 primis dilatatis. |
| 2. | Mentum dente medio apice rotundato. | Mentum dente medio apice inciso. |
| 3. | Prothorax lateribus crasse marginatus, basi juxta angulos postices acuminato-productos fortitur sinuatus. | Prothorax lateribus subtiliter marginatus, basi juxta angulos posticos rectiusculos vix sinuatus. |

In the first character, the differences are far too vague to be worth anything, the claws being elongated in the one and very often greatly elongated in the other, and the tarsal segments being weakly dilated in one and dilated in the other. The second point, as to the rounded or incised apex of the median tooth of the mentum, seems to be a mis-statement. Presumably, the 'tooth' referred to is the median lobe of the tri-lobed mentum, and, if so, *grapii* has a suggestion of a dip in the anterior border of this lobe, as has also *exsoletus* (and an American species *tostus* Lec.), but the other British species have the lobe rounded. There is no marked difference in the lateral margins of the pronotum in *grapii* and the other species. The margin varies in different species and the black colour of *grapii* makes the border appear greater than it actually is. There is, however, a difference in the posterior pronotal angles of *grapii* and the other species. These angles are certainly more acute in *grapii*, but their form is approached in *pulverosus*; *exsoletus* perhaps comes next, while *adspersus* and *notatus* have the most obtuse angles, but there is certainly nothing here upon which to base a genus.

Seidlitz gives three main characters for separating his *Colymbetes* (including the single species *grapii*) from *Rantus*, one of which is that of the posterior pronotal angles already discussed. The other two are as follows :—

| | |
|---|---|
| 1. Fourth segment of mid-tarsi of male scarcely longer than the third. | Fourth segment of mid-tarsi of both sexes longer than the third. |
| 2. Dilated segments of anterior tarsi of male compressed. | Anterior tarsi of male for the most part not compressed. |

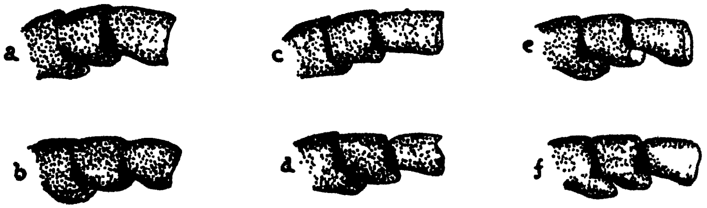

FIG. 26.—The third and fourth segments of the anterior tarsus of the males of (a) *Rantus grapii*, (b) *exsoletus*, (c) *pulverosus*, (d) *notatus*, (e) *bistriatus*, (f) *adspersus*.

With regard to the first of these, the difference between ‘ longer than ’ and ‘ scarcely longer than ’ is more apparent in the words than in the segments, but, as the camera lucida drawings show (fig. 26), in *grapii* and in *pulverosus* the fourth segment is quite definitely longer than the third, and obviously the character cannot be used for breaking up the genus. With regard to the compression of the dilated segment of the anterior tarsi of the male, Seidlitz not only qualifies his distinction in the genus *Rantus* by using the words ‘ meist nicht comprimirt,’ but in the species-table for the genus he separates those species in which the dilated segments are compressed (*pulverosus* and *notaticollis* Aubé) from those in which they are not (*notatus, bistriatus, adspersus*, etc.).

Zaitev (1907) replaced *Colymbetes*, as used by Thomson and Seidlitz, by *Nartus*, but he has merely changed the generic name and has given no determining characters. Des Gozis (1910), without any reference to *Colymbetes* or *Nartus*, introduces the name *Rantogiton* and relies upon colour and the form of the posterior pronotal angles for separating it from *Rantus*. These two authors, therefore, beyond introducing new names, have done nothing to support the view that *grapii* is generically distinct from the species of *Rantus*, a view for which, in my opinion, there is no justification.

Hope (1838) made *Dytiscus pulverosus* Knoch the genotype of *Rantus*, and this is the species described under that name by Stephens (1828), who in his Catalogue (1829) has '*Dy. pulverosus* Knoch. *Dy. conspersus* Gyll., I. 482. *Dy. gyllenhalii* mihi (olim).' Crotch (1872-3) made '*collaris*' the genotype, presumably in ignorance of Hope's paper.

With regard to the six species in the British list, there is considerable difficulty as to the correct names for three of them, those described by Fowler (1887) as *pulverosus* Stephens, *bistriatus* Bergstrasser and *adspersus* Fabricius. The spelling of *exoletus* must be altered to *exsoletus*, as given by Forster (1771), the original describer. A number of authors regard *pulverosus* as a synonym of *conspersus* Gyllenhal (1808): for instance, Erichson (1839), Fairmaire (1854), Gemminger and Harold (1868), Seidlitz (1886/90), Reitter (1906), Des Gozis (1910); but of these seven, only one, Seidlitz, gives Gyllenhal's name priority. Reitter and Des Gozis name the species *punctatus* Geoffroy, while the other four give it Stephens' name. It is, however, to be noted that Stephens himself (1828, p. 73) says: 'The *Dy. conspersus* of Gyllenhal is synonymous with *C. pulverosus* . . . ,' which should surely indicate that Gyllenhal's name is the correct one for this species, and this view is supported by the fact that Gyllenhal's description of his species certainly suits this one. But it is also to be noted that Gyllenhal, in describing his species, gives 'Marsham Ent. Brit. I. 427.37' as a reference, which reference is actually to *Agabus conspersus*. Des Gozis also, under the name *punctatus* Geoffroy, gives *pulverosus* as a synonym, but for reference he gives 'Steph. Ill. Brit. II. 69, T. 12, f. 2,' both description and figure being *Agabus conspersus*. Through the courtesy of Herre Arwidsson of the University Museum, Uppsala, Sweden, I have seen a male and female specimen from Gyllenhal's Collection of his *Dytiscus conspersus*, and they are *Rantus notatus* Fab. It appears, therefore, as if Stephens' name was the most reliable for this species, and I propose to suggest to the Committee on Generic Nomenclature of the Entomological Society that they should take steps to ensure that this species should in future be known as *Rantus pulverosus* Stephens.

Through the courtesy of Messrs. F. S. Carr and J. B. Wallis of Canada, and of Professor Melville H. Hatch of the University of Minnesota, U.S.A., I have had opportunities of examining a number of specimens of *Rantus suturellus* Harris. Our British *bistriatus* is undoubtedly this species, and thus we would have to accept Harris' name for it if, as stated by continental authors, our species were not *bistriatus* of Bergstrasser, of which they describe our *adspersus* Fab. as a synonym. Unfortunately it appears that no types of these species are available. Bergstrasser's collection seems to have disappeared, as it is not in Horn's list (1926). I have seen specimens of *adspersus* from the Fabrician collection, through the courtesy of Dr. O. Schröder of the Zoologisches Museum, Kiel University, and of *bistriatus* from Erichson's collection, through the courtesy of Dr. Heinrich Küntzen of the Zoologisches Museum der Universitat, Berlin, but none of these specimens bears any label indicating that it was a type. Erichson's specimens were carrying various labels; four of the specimens, one male and three females, were apparently Erichson's own collecting, and three, two of them male, were from C. G. Thomson with labels '2-striatus' and 'bistriatus' 'C. G. Thomson.' Unfortunately there is absolutely nothing in Bergstrasser's description which does not equally apply to *suturellus* and to *adspersus*; but if he was describing the latter it is perhaps significant that he failed to remark on the testaceous borders to the abdominal segments, a point which Fabricius does not overlook, as already mentioned. The fact that Fabricius, in his synonym, indicates that his species is that described under the same name by Panzer (1794) and Illiger (1798), although their descriptions clearly show that both these authors were describing *exsoletus,* merely shows that synonymies were built up in those early days as they frequently are now. To my mind, the evidence favours the view that Bergstrasser's *bistriatus* is identical with *bistriatus* of Erichson, and is therefore the same species as *suturellus* of Harris, and, that being so, Bergstrasser's name has priority, *adspersus* of Fabricius being a distinct species. The British list is therefore :—

*Rantus* Lacordaire, 1835.
  *grapii* Gyllenhal, 1808.
  *exsoletus* Forster, 1771.
  *pulverosus* Stephens, 1828 = ? *conspersus* Gyllenhal, 1808.
  *notatus* Fabricius, 1781.
  *bistriatus* Bergstrasser, 1778, and Erichson, 1837 = *suturellus* Harris, 1828.

*adspersus* Fabricius, 1801.

With regard to *exsoletus,* Messrs. Newbery and W. E. Sharp introduced a variety '*nigriventris*' in 1915. The specimens were taken at Askham Bog, York Mid-West, in 1895, and I was sent one of them for identification in 1911. I returned it as being '*exoletus,* slightly abnormal in shape and dark in colour.' The chief peculiarity of this so-called variety is the dark colouring of the underside, which can scarcely be called black. I have seen specimens in the collection of Willoughby Ellis, taken at Wood Walton Fen, Hunts, in 1916, some of which are intermediate in colouring between normal *exsoletus* and the extreme form. I have also seen specimens in the collection of Anderson Fergusson from Possil Marsh, Lanark (1932), from Loch Fad, Bute (1910), and from Stevenston, Ayr (1911), and I am satisfied that the colouring is due to local conditions.

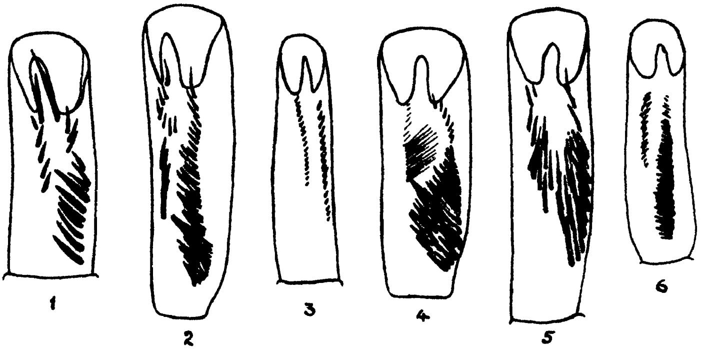

FIG. 27.—The apical tarsal segment of the male of Rantus spp. to show chaetotaxy. (1) *grapii,* (2) *exsoletus,* (3) *pulverosus,* (4) *notatus,* (5) *bistriatus,* (6) *adspersus.*

The most obvious characters for distinguishing the British species are the male secondary sexual ones and colour. The males of all the species can at once be indentified by the anterior and middle tarsal claws and by the chaetotaxy of the apical segment of the anterior tarsus, as will be seen from the drawings here given (fig. 27). Although I usually regard colour as unreliable, it appears to be a useful character in this genus, and I have used it in the following table :—

### TABLE FOR DETERMINING THE BRITISH SPECIES.

1. Upper side black .......................................................... *graphii.*
Upper side testaceous irrorated with black .......................................... 2.
2. Pronotum testaceous with a black central ' island ' .......................... 3.

Pronotum testaceous with or without a black basal mark, but no central 'island' .......................................... 4.

3. Prosternum (and prosternal process) pitchy. Rest of underside pitchy except at most the metasternal coxal processes and a streak forward from them, and also the sides of the anterior abdominal sterna, which may be dark chestnut .................................................... *pulverosus.*

Prosternum (and prosternal process) testaceous with or without a black band along the posterior margin. Abdominal sterna either mainly testaceous with some black (♀) or mainly black with distinct testaceous regions (♂) ........................................ *notatus.*

4. Under side of anterior abdominal sternum black or dark .................. 5.

Under side with anterior abdominal sternum testaceous ...................... 6.

5. Posterior tarsal claws the shorter about half the length of the longer. Metasternal 'wings' narrow. (A line drawn across the metasternum from one 'wing' apex to the other crosses the median line of the metasternum behind the middle.) (See fig. 28) .......... *exsoletus (nigriventris).*

Posterior tarsal claws the shorter about one-third the length of the longer. Metasternal 'wings' broad. (A line drawn across the metasternum from one 'wing' apex to the other crosses the median line of the metasternum about the middle.) (See fig. 28) .................. *bistriatus.*

6. Under side entirely (or almost entirely) testaceous .................. *exsoletus.*

Under side black with only the prosternum, anterior abdominal sternum and hind margins of the other abdominal sterna testaceous .. *adspersus.*

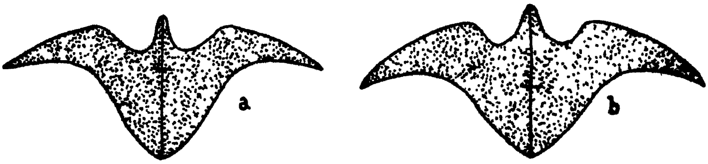

FIG. 28.—Metasternum of (a) *Rantus exsoletus* and (b) *R. pulverosus,* drawn with camera lucida from flattened specimens on microscope slides. The short transverse line across the median suture shows the position of a line drawn from the apex of one 'wing' to that of the other.

*A new locality for Aulonium trisulcum Geoff.*—During the past week I have taken three specimens of *Aulonium trisulcum* Geoff. flying to light in my house. This is an interesting addition to the list of Surrey Coleoptera.—L. F. BARTON, Chobham, Surrey: *August* 14th, 1935.

*Osmylus fulvicephalus Scop.* (*Neuroptera*) *in Sheffield.*—In June of this year I was fortunate in taking specimens of the large spotted-winged lacewing-fly, *Osmylus fulvicephalus* Scop. (*chrysops*) in the Ecclesall Woods within the borough of Sheffield. The first example was beaten from an oak overhanging a small stream, and later in the evening several others were seen flying near the same place. The only previous record of this insect in Yorkshire is, I believe, that of the late G. T. Porritt, who took it at Castle Howard some years ago.—JAMES M. BROWN, 176 Carter Knowle Road, Sheffield: *September 20th,* 1935.

# NOTES ON THE AMERICAN SPECIES OF *COLYDODES* (COLEOPTERA, COLYDIIDAE).

BY HOWARD E. HINTON, B.SC., F.R.E.S.
(Zoological Laboratory, Cambridge.)

This paper was begun with the intention of revising the American species of the genus *Colydodes,* but as the work proceeded it soon became apparent that such a course was not advisable, for the males of two species (as will be mentioned below) were not represented in the material before the writer, and the type of one species, *C. gibbiceps* Motsch. (*nec* Sharp), could not be obtained if, indeed, it is still preserved. From the description and figure of this latter species little can be made, and it may be either *C. mamillaris* of Pascoe, or one of the two new species herein described, or, possibly, a fourth Central American species.

To date apparently six valid species of this genus have been described, of which three, *samoensis* Arrow, *setosus* Reitt., and *wallacei* Pasc., are known from the tropical parts of the Oriental region. This distribution is rather difficult to account for, the most likely theory being that ancestral forms of the present species crossed the shelf-bridge of the Bering Straits in Middle Jurassic times. The species described as *Colydodes denudatus* by Arrow belongs to another genus as will be stated elsewhere by the writer.

The text-figures were drawn by the author with the aid of a prism-projector.

### *Colydodes mamillaris* (Pasc.) (1860).
(Text-figs. 2 and 3.)

This species has been heretofore recorded only from Brazil, but nine specimens are before the writer from Costa Rica : Reventazon (*F. Nevermann*) and two from the Lesser Antilles : St. Vincent (*H. H. Smith*). It is possible that this is Grouvelle's species, *C. bostrychoides,* from Guadeloupe, but the original description is not ample enough to determine this with any certainty. From all of the continental American species it may be easily separated by the structure of the male genitalia (text-figs. 2 and 3) and the absence of a median, longitudinal, and non-tuberculate line at base of pronotum.

### *Colydodes batesi* (Pasc.) (1863).
(Text-figs. 7 and 8.)

1863. ***Distaphyla batesi*** Pascoe, Journ. Ent. II, p. 83.
1863. ***Distaphyla speculifer*** Pascoe, Journ. Ent. II, p. 84.
1930. ***Colydodes batesi*** Hetschko, Col. Cat. 107, p. 25.
1930. ***Colydodes speculifer*** Hetschko, Col. Cat. 107, p. 26

Unfortunately, *C. speculifer* (Pasc.) must be relegated to synonymy. The writer has examined the types of both species and can find no good difference.

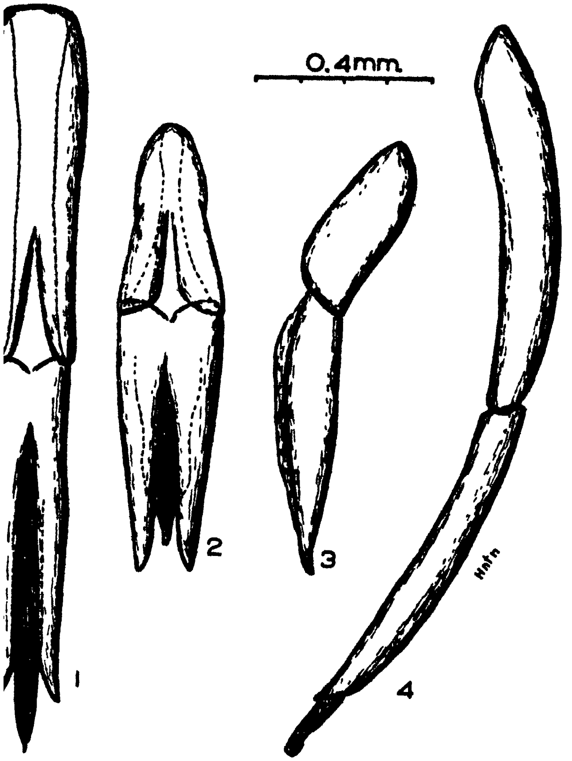

FIG. 1. Dorsal view of male genitalia of *C. immsi* Hntn.
,, 2. Dorsal view of male genitalia of *C. mamillaris* (Pasc.).
,, 3. Lateral view of male genitalia of *C. mamillaris* (Pasc.).
,, 4. Lateral view of male genitalia of *C. immsi* Hntn.

## *Colydodes immsi* Hinton, sp. n.
## (Text-figs. 1 and 4.)

Male :—Slightly robust, elongate, parallel, convex; clothed throughout with suberect to erect, fine, stiff, moderately long dorsal and moderately short ventral, testaceous hairs. Cuticle subopaque, black to piceous; antennae, mouth-parts and legs rufo-piceous.

Head with the narrowest portion between eyes broader than anterior margin of clypeus (28 : 19) and broader than greatest breadth of eye (28 : 13); with a broad, strongly concave, roughly semi-circular impression extending forwards from posterior margins of eyes; sides and eyes strongly elevated and bordering semi-circular impression; base of clypeus noticeably less elevated and extending posteriorly to semi-circular impression where the base is truncate; head behind base of clypeus more strongly convex than elsewhere; sides behind eyes (portion entirely concealed when head is in normal position) with a short, narrow, deep, semi-circular stria. Clypeal suture finely impressed, nearly obsolete near sides in front of antennal bases; clypeus truncate in front, with the angle on each side obtusely rounded. Surface coarsely and densely tuberculate, tubercles often flat-topped and irregularly shaped; on anterior portion of clypeus the tubercles are finer; anterior sides of strongly convex frontal portion very finely and densely punctate, not tuberculate.

Prothorax longer than broad (59 : 49) and the greatest breadth near apical angles greater than breadth at base (49 : 46). Apical margin deeply and broadly tri-emarginate, with the lateral emargination much broader than the middle one; apical angles prominent, strongly produced forwards (produced appearance due in part, at least, to the adjacent deep emargination), slightly directed outwards, acute and feebly rounded at apex; sides nearly straight, feebly diverging towards apex, completely margined and coarsely, rather evenly crenate, the crenate appearance being due to the rather evenly spaced tubercles of lateral margin; basal angles obtuse, scarcely rounded; base nearly straight, deeply and completely margined. Pronotum at apical one-fifth with the usual transverse impression and in front of this impression at middle with two very large, obovate, tubercle-like gibbosities, broadly rounded in front, connected to each other (when viewed dorsally) by a narrow medial portion and deeply, subtringularly emarginate behind; region of apical angles gibbous, but to a much lesser extent, and separated from the middle gibbosity by a deep, oblique impression; pronotum on apical one-half with a longitudinal impression which is very broad and as deep as apical transverse impression where it is joined to the latter, but becoming shallower and narrower posteriorly and represented as a parallel sided, scarcely depressed, moderately broad line on basal one-half, on each side of this basal line separated by an interval of less than its breadth is a similar line. Surface, except on depressed areas or lines, coarsely tuberculate, with the tubercles often confluent and seldom separated by as much as their diameters; tubercles on pronotal gibbosities slightly finer and more polished.

Elytra about twice as long as prothorax (115 : 59) and breadth at humeri greater than breadth of prothorax at base (49 : 46). Alternate intervals nearly flat. Even intervals each with a row of coarse, subquadrate punctures which are separated longitudinally by about their own diameters and are about two-thirds as broad as alternate intervals; portion between punctures on same row with a longitudinal, narrow, cariniform-like tubercle extending from apex of one puncture to base of following puncture. Scutellum subovate, about as broad as long, and with two basal and one median longitudinal tubercle.

Middle of prosternum feebly convex, extremely coarsely punctate with subquadrate punctures which are usually confluent. Mesosternum with the punctures about half as coarse as those of prosternum, very dense and often confluent. Disk of metasternum with a fine, longitudinal, impressed line which is nearly complete; surface of disk and ventral abdominal segments densely to confluently, subrugosely punctate, with punctures which are about as fine as those of mesosternum; apical abdominal segment with a deep, semi-circular impression bordering apical margin. Length 4.5—5 mm.; breadth 1.1—1.6 mm.

Female :—Externally similar to male.

TYPE: A male in the collection of the United States National Museum. Honduras: La Ceiba (*W. M. Mann*).

PARATYPES: Two with the same data as above and one, Honduras : San Pedro (*W. M. Mann*).

Some of the specimens are entirely of a rather pale rufopiceous colour. Near to this species, I associate a form which is probably distinct, but which I shall not describe at present since there are no males before me. The species in question is represented by a small series of females from Guatemala: San Geronimo (*Champion*), which are now in the collection of the British Museum. To this same category I relegate still another species in the above Museum from Panamá: Volcan de Chiriqui (*Champion*). This latter species is represented by a single female.

This new species differs notably from *C. mamillaris* Pascoe in the structure of the pronotum, which has a distinct, median, longitudinal, non-tuberculate line extending from near base to apical one-fifth, whereas *mamillaris* has no such line. From the Brazilian *C. batesi* Pascoe it differs in having the two pronotal lobes more triangular and less oblong. From all species so far described, it may also be distinguished easily by the structure of the male genitalia (text-figs. 1 and 4), which are drawn with the median lobe somewhat drawn out.

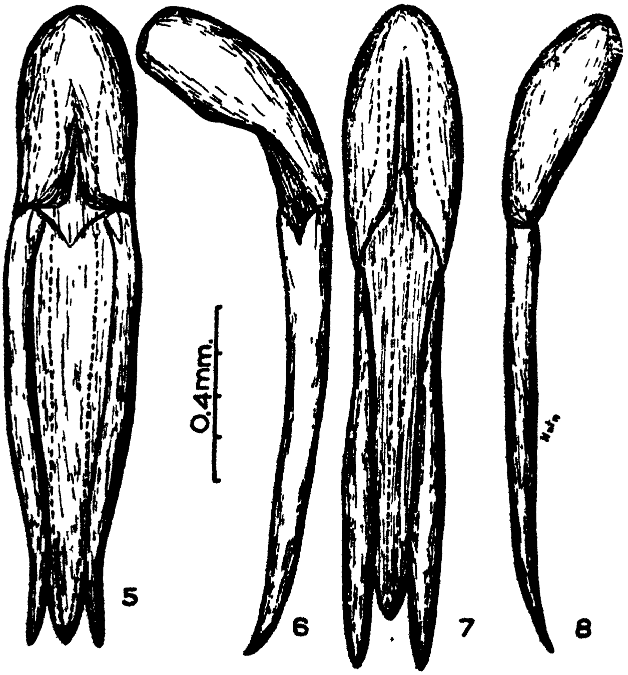

FIG. 5. Dorsal view of male genitalia of *C. sparsus* Hntn.
,, 6. Lateral view of male genitalia of *C. sparsus* Hntn.
,, 7. Dorsal view of male genitalia of *C. batesi* Pascoe.
,, 8. Lateral view of male genitalia of *C. batesi* Pascoe.

## *Colydodes sparsus* Hinton, sp. n.

(Text-figs. 5 and 6.)

Male :—Moderately robust, elongate, parallel, convex; clothed throughout with recumbent to erect, fine, stiff, moderately long dorsal and moderately short ventral, testaceous hairs. Cuticle rufo-piceous; legs and antennae paler.

Head with the narrowest portion between eyes broader than anterior clypeal margin (30 : 20) and broader than greatest breadth of eye (30 : 17); with a broad, strong, roughly semi-circular impression extending forwards from posterior margins of eyes; sides and eyes strongly elevated and bordering semi-circular depression; base of clypeus notably less elevated and extending posteriorly to semi-circular depression where base is subtruncate; head behind base of clypeus more strongly convex than elsewhere. Clypeal suture not distinct except at base, where it is feebly arcuate; anterior margin of clypeus broadly and very feebly emarginate, nearly truncate, with the angle on each side obtuse. Surface with the sides and anterior portion of basal convex portion not tuberculate, impunctate and highly polished, discal area of the basal convex portion with tubercles which are often about twice as coarse as facets of eye, are flat-topped and are seldom separated by more than a third of their diameters except for a small, polished, anterior area; elsewhere and on clypeus much more finely and rugosely, confluently tuberculate.

Prothorax longer than broad (73 : 60) and greatest breadth near apical angles greater than breadth at base (60 : 53). Apical margin tri-emarginate, with the emargination on each side very much broader and deeper than middle emargination (emargination between the two frontal tubercles); apical angles prominent, appearing strongly produced forwards and feebly directed outwards, acute but feebly rounded at apex; sides nearly straight but feebly sinuate at middle and then again more feebly so just before apical angles, feebly diverging towards apex, margined to gibbous portion near apical angles, coarsely, rather evenly, crenate, the crenate appearance being due to rather evenly spaced tubercles of lateral margins; basal angles obtuse; base nearly straight, deeply, completely margined. Pronotum with the two apical tubercles or lobes in front of the apical transverse impression oblong, nearly rectangular, broadly rounded in front and behind, connected to each other (when viewed dorsally) by a narrow medial portion and each not triangularly emarginate behind; at side of each frontal lobe is a much lesser lobe which is less elevated; region of apical angle gibbous and only slightly more prominent than lesser apical lobe, and separated from it by a deep, oblique impression; on apical one-half with a longitudinal impression which is very broad and as deep as apical transverse impression where it joins the latter, but becoming shallower and narrower posteriorly and represented as a parallel-sided, feebly convex, moderately broad line on basal one-half; on basal one-third on each side of this convex line separated by a distance of less than its breadth is a similar line. Surface, except on depressed areas or lines, coarsely tuberculate with obovate, feebly convex tubercles which are separated occasionally by as much as one times their diameter, but are usually contiguous; tubercles absent from a highly polished, moderately large area on anterior middle portion of disk on each side of median, longitudinal line; on discal portion the tubercles are usually sparser than in other members of the genus and are usually separated by about one-half their diameters; depressed areas or lines not tuberculate, impunctate and highly polished.

Elytra more than twice as long as prothorax (160 : 73) and breadth at humeri greater than breadth of prothorax at base (60 : 53). Alternate intervals nearly flat. Even intervals each with a row of coarse, subquadrate punctures which are separated longitudinally by about to slightly more than their lengths and are about one-half to two-thirds as broad as alternate intervals; portion between punctures on same row with a longitudinal, narrow, cariniform-like tubercle extending from apex of one puncture to base of following puncture. Scutellum subovate, transverse.

Surface beneath microscopically alutaceous for the most part. Middle of prosternum feebly convex, extremely coarsely punctate, with very irregularly shaped punctures which are usually confluent. Mesosternum with the punctures finer than those of prosternum and mostly round to obovate, seldom separated by as much as half their diameters and often confluent. Disk of metasternum with a fine, longitudinal line which is only distinct in basal one-half; surface of metasternum and ventral abdominal segments punctate similarly to prosternum, but sides of abdominal segments with the punctures finer and less often confluent; apical abdominal segment with a deep, semi-circular impression bordering apical margin. Length 5—6 mm.; breadth 1.8 mm.

Female:—Externally similar to male.

TYPE: Male in the collection of the British Museum. Panamá: Volcan de Chiriqui (*Champion*).

PARATYPE: Female with the same data as above.

This species may be separated from all the American species except *C. batesi* (Pascoe) by its much more sparsely tuberculated pronotum. From *C. batesi* (Pascoe) (text-figs. 7 and 8), the new species may be easily distinguished by the structure of the male genitalia (text-figs. 5 and 6).

University of Cambridge,
Department of Zoology.
*May 15th,* 1935.

## NOTES ON THE SEASON 1934-35 IN NEW ZEALAND.

BY G. V. HUDSON, F.R.E.S., F.N.Z.INST.

Our 'First White Butterfly,' *Pieris rapae* L., was seen on August 2nd, 1934 (equivalent to February 2nd in England), and by the second week in October the insect was fairly numerous in all the gardens. After this it rapidly increased in numbers, appearing without intermission until the present time, March 27th, when it is still abundant on all sunny days. Some idea of its numbers may be gleaned from the fact that, as a rule, about six specimens were in sight at once.

During the spring months, from August until the end of November, we experienced unusually warm, fine and calm weather, but only a few hybernated specimens of *Vanessa gonerilla* Fab. were in evidence. On December 17th, however, quite a number of fresh specimens were observed, on *Buddleia* flowers, at South Karori, and in other localities visited the insect was certainly commoner than it was last summer. Larvae also occurred in some numbers on the tree-nettle (*Urtica ferox*). The prospects of the restoration of this beautiful butterfly to something like its normal numbers are therefore encouraging.

On December 4th I observed several specimens of *Pieris rapae* flying about the gardens in Picton, thus indicating that this ubiquitous species had succeeded in establishing itself in the northern part of South Island. The day after, a short visit was made to Tophouse, an inland locality from Nelson, having an elevation of about 2,500 feet above the sea level. Here the original flora consists mainly of beech (*Nothofagus*) interspersed with many other interesting sub-alpine plants. It was at once evident that conditions were unusually dry for so early in the season, and the collecting was not up to the standard expected as a result. A good series of the rare and interesting weevil *Platyomida enysii* Broun was beaten out of the beech, and several specimens of the large Caddis fly, *Oeconesus maori* McL., occurred amongst foliage on the margins of streams as well as a good series of the local *Glyphipteryx codonias* Meyr. Collecting around Wellington during the rest of December was almost a failure, owing to the excessive heat and drought then prevailing, although, in normal years, this is our most prolific period. For the same reason the results of my usual visit to Arthur's Pass, during the middle of January, were much below the average. For instance, *Orocrambus pervius* Meyr., which usually swarms on hot days over wet cushion-plants and moss, in swampy places, on the top of the Pass was in a wasted condition and practically over, and the same remarks apply to nearly all the interesting Lepidoptera generally found in abundance on the mountains around the Pass.

The late summer and autumn has proved, as might have been expected, even more dried up than usual, and before the end of February flowers and insects alike were practically over. But the most remarkable entomological feature of the season has been the almost complete absence of Cicadas. The little *Melampsalta iolanthe* Huds., which appears in November and December, was certainly about up to the average, but of the large, conspicuous and highly vociferous *M. cingulata* Fab. hardly any were in evidence. In normal seasons, on the edges of the forest, on the eastern side of Wellington Harbour, during hot summer days in late February and in March, this insect occurs in great profusion. Its singing at such times is quite distressing, the general impression conveyed being that of many frying-pans going at top speed on hot fires.

In March 1929, at Howard Road, in the above-mentioned locality, I often counted as many as 40 individuals perched on a single telegraph pole, or tree trunk, but this year the forests are silent. It seems possible that the severe drought experienced in the early summer may have hardened the soil to such an extent that the Cicada nymphs have been unable to force themselves to the surface. It will be very interesting to see what happens next season, for, if this year's nymphs survive, there should be an excess of perfect insects. Again, future observation should determine whether, as the result of the dearth of 1935, a marked scarcity of *Melampsalta cingulata* recurs several years later, as it is practically certain that this insect takes a long period to come to maturity, possibly even as long as its celebrated American congener, the well-known seventeen-year Cicada (*C. septendecim* L.).

' Hillview,' Karori, W.3, Wellington, N.Z.
*March 27th,* 1935.

## A SUGGESTED EXPLANATION OF VARIATION IN CRYPTIC LEPIDOPTERA.

BY G. D. HALE CARPENTER, D.M., F.R.E.S., F.L.S., F.Z.S.
Hope Professor of Zoology (Entomology) in the University of Oxford.

An explanation of a phenomenon becomes the more convincing if conceived independently by a second person unaware that the same suggestion had been made many years before.

Mr. G. V. Hudson in the July number of this Magazine, under the title at the head of this note, writes (pp. 156-8) in a most interesting article : ' So far as I am aware no attempt has so far been made to explain why Cryptic Coloration should be associated with great variability ' ; and in a later passage, after alluding to ' the conception of "Common Warning Colours," ' continues : ' Now the idea which has occurred to me is the obverse of this. A cryptic resemblance . . . if possessed by a common and highly edible species, would soon be recognised and learnt by predators, and . . . would tend to become less efficient as the knowledge of predators increased. On the other hand, if the disguise is varied in endless detail, the task of learning and locating the cryptic species is enormously increased, and in this way great benefit will accrue to all species which add to a cryptic appearance the additional attribute of great variability.'

Mr. Hudson's conclusions, derived from the study of the New Zealand fauna alone, are rendered more valuable by the interesting locality. It is, however, only just that it should be realised that this is *not* the first occasion on which such an explanation has been put forward. It was E. B. Poulton, now Sir Edward Poulton, F.R.S., who in 1884 wrote: 'I think all will admit that the larvae upon a tree stand a better chance against their various enemies if they belong to two differently coloured species (both well protected) than if they are all the same. So dimorphism is an advantage when the divergence in colour is quite complete. Again, a large number of larvae of one colour attracts attention and multiplies the chances of detection, and increases the danger for all.'

Again, in 1888, Poulton wrote in regard to green and brown larvae: 'The fact that both varieties exist, demonstrates that the dimorphism is advantageous to the species—that each variety becomes of especial advantage when a certain proportion between the numbers of the two forms is reached.'

Allusion was made by Poulton to these conclusions in his classical work (1890) as follows: 'I believe that it is a benefit to the species that some of its larvae should resemble brown and others green catkins, instead of all of them resembling either brown or green. In the former case the foes have a wider range of objects for which they may mistake the larvae, and the search must occupy more time, for equivalent results, than in the case of other species which are not dimorphic.'

In 1908 Poulton again discussed polymorphism and wrote: 'Such differences extend the area over which an enemy must search in order to obtain its food.'

The question of polymorphism, whether among aposematic or procryptic species, is discussed in 'Mimicry,' 1933, in which the writer made use of Poulton's results in the following words: 'Thus it is to the advantage of an Apatetic species, in Poulton's words, "to extend the area over which an enemy must search." The principle is the same whether the objects resembled are leaves or other butterflies.'

It is unfortunate that Mr. Hudson was not aware of the literature of this subject when communicating his most interesting notes, which so beautifully confirm previous observations.

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University Museum, Oxford
(Department of Entomology).
*August*, 1935.

*New, rare and local Irish Coleoptera.*—The majority of the following Coleoptera were taken in North Co. Dublin during this year; two are new to the Irish list, though one is undoubtedly introduced.

*Antherophagus silaceus* Herbst.—A single example swept from a clump of *Typha* at Kilbarrach, Co. Dublin, early in July; this is the second Irish station. *Chilocorus bipustulatus* L.—One beaten in pine plantation near Prosperous, Co. Kildare; a new county record, taken in June. *Elater pomorum* Herbst.—Swept off a sallow in the same place as the *Chilocorus*, and also unrecorded for Kildare. *Athous difformis* Lac.—Many ♂♂ of this species were swept at dusk at Clontarf, Co. Dublin, in June and July. Only one ♀ was taken. *Ernobius mollis* L.—About a dozen examples beaten out of Austrian pine at Clontarf in June, July and the first week of August; Gillanders in 'Forest Entomology' gives spruce and larch. *Ochina ptinoides* Marsh.—Many specimens beaten from old ivy and two beaten from ash at Clontarf in June and July. *Ptilinus pectinicornis* L.—This species is fairly plentiful all over the Clontarf—Raheney district. *Vincenzellus viridipennis* Lat.—One under bark, Clontarf, July. *Rhynchites aeneovirens* Marsh.—One taken at Prosperous, Kildare, in June. *Polydrosus pilosus* Gred.—A single example swept at Prosperous, Co. Kildare, in June. This is an addition to the Irish list. *Orchestes alni* L.—A number beaten from elm at Clontarf in July. *Notaris bimaculatus* F.—Two under seaweed, Raheney Strand, Co. Dublin. *Rhamphus pulicarius* Herbst.—Some numbers beaten off crap apple and whitethorn at Clontarf. A number of these have completely black antennae. *Anthonomus pedicularius* L. —Very plentiful on whitethorn, also at Clontarf, June and July. *Ceuthorrhynchus quadridens* Panz.—One swept in garden, Clontarf. *Ceuthorrhynchidius mixtus* Muls.—One beaten from ash, Clontarf, July. This specimen was named by Dr. K. G. Blair and is the second Irish station. *Dryocoetes autographus* Ratz.—Dublin. A number of living examples in imported conifers; this species, which was accompanied by *Pityogenes chalcographus* L. and *Hylastes palliatus* Gyll., is unrecorded as having been taken in Ireland before. In these poles I obtained a single example of the genus *Pissodes*, but the specimen was injured and immature so I could not determine the species.

I wish to thank Dr. Blair for much help in naming various specimens and checking my determinations.—EUGENE O'MAHONY, National Museum, Dublin: *August 16th*, 1935.

*The Species of Lestes (Odonata).*—A paper prepared by the Committee on Generic Nomenclature has recently been distributed amongst the Fellows of the Royal Entomological Society, dealing with the generic names of the British Odonata. I should be sorry to give the impression that I am criticising; indeed, I am not competent to do so. One sentence arrested my attention and induced me to look into the matter more closely. On p. 56 under *Lestes* it is stated that 'the first author to put any British species in this genus was Stephens, 1836, Ill. Brit. Ent. Mandib., vi, 77.' This is clearly incorrect, as Samouelle in The Insect Compendium (1819) mentions two species of this genus, *viz.*, *autumnalis* Leach MSS. (p. 259) and *sponsa* (p. 410) and Stephens in his Systematic Catalogue (1829) gives three, adding '*Nympha*, Leach MSS.'

Tracing these three species down to 1900 leads to rather revolutionary conclusions, which I forbear to state as the subject is outside the scope of the pamphlet.—E. G. BAYFORD, 38 Eldon Street, Barnsley: *September 10th*, 1935.

*Viviparity in Cockroaches.*—In last year's volume of this Magazine (p. 230), there is a note on this subject which, because of my ignorance of the points needing investigation, was not as full and complete as it might have been. This year I have been fortunate in having the opportunity of repeating observations on the same species, *Panchlora viridis* Burm. On this occasion the specimen gave birth to exactly fifty perfectly formed, living young of a dull testaceous colour. A careful dissection of the parent failed to disclose any sign of an egg-case, although one perfectly formed young one was found in the vaginal passage. —E. G. BAYFORD: *September 10th*, 1935.

*Notes on Capsidae.*—It has generally been accepted that the commonest species of Capsid on black currants is *Lygus pabulinus* L., but during the last two or three years the writer has observed several instances where *Lygus* was entirely absent and instead the bushes were severely damaged by the Apple Capsid *Plesiocoris rugicollis* F. In other cases both species were present, and here in almost every case *Plesiocoris* seemed to predominate.

In 1934 and 1935 *Plesiocoris* was found causing severe damage in commercial black currant plantations at Stalham, Norfolk, and Topsham, Devon, and *Lygus* appeared to be entirely absent; while at Acton Bridge, Cheshire, *Plesiocoris* and *Lygus* were both present in the proportion of about ten to one. Here young apple trees were growing among black currants, and the apples were attacked only by *Plesiocoris*, while both species were found on the currants.

Up to the present *Plesiocoris* has not been recorded to any great extent in Cheshire, the damage to both black currants and apples generally being attributed to *Lygus*. During 1935 the writer found *Plesiocoris* to be the sole cause of damage to apples in several fruit plantations in Cheshire, and was, in fact, unable to discover a single case where *Lygus* was responsible for damage to apple. On black currants, in Cheshire, in some cases *Lygus* occurred alone and in others was found associated with *Plesiocoris*, the latter species always being in the majority.

An interesting case of Capsid attack was noted this year in an orchard near Dartford, Kent. A number of bush apple trees had been cut hard back last year, leaving only the trunk and a few short stems. In spring this year the trees were top-grafted, and later on it was observed that they were severely attacked by Apple Capsid. It is highly improbable that the eggs were present in the trunk and main stems and it would appear therefore that the eggs must have been present in the grafts.

Another interesting case was noted in an orchard near Rainham, Kent, about three years ago. Here a block of black currants was noted in the spring to be severely attacked by *Lygus pabulinus* L. During the summer, after the Capsids had migrated as usual to herbaceous plants and weeds, the currants were uprooted and burnt. In the autumn, when the Capsids wished to return to their winter host to lay their eggs, they found the currants gone and therefore settled on a block of pear trees adjacent to where the black currants used to be. Here they fed on the leaves and fruit, causing quite an extensive amount of damage.—G. L. HEY, One Tree House, Church Road, Leyland, Lancs.: *September 1st*, 1935.

## Society

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON: *Wednesday, June 5th*, 1935.—SIR EDWARD POULTON, F.R.S., Honorary Life President, in the Chair.

The following were elected Fellows of the Society: Howard R. Binns, M.A., The Nyasaland Veterinary Service, Zomba, Nyasaland; Kenneth H. L. Key, 13 Cornwall Gardens, S.W.7.

The Treasurer read a letter from the Home Office expressing His Majesty the King's appreciation of the Loyal Address presented on the occasion of the Silver Jubilee.

The Honorary Life President announced with deep regret the death of Mr. Robert Adkin, elected in 1885, a great benefactor of the Society, and of Mr. C. E. Stott, elected a Fellow in 1919.

Sir Edward Poulton read the following circular regarding the distribution of the agenda of General Meetings:—

'The Council have had under consideration the question whether steps could be taken to improve the present arrangements for the General Meetings of the Society. It has been represented to them that Fellows of the Society would be glad to receive in advance of each meeting a printed agenda paper showing the principal communications and exhibits arranged to be made at the next meeting. In this way Fellows having special knowledge of any of the matters proposed to be communicated to the Society at that meeting, or of the exhibits proposed to be shown thereat, would be able to come to the meeting prepared to take part in the discussion. It is felt also that the issue of agenda papers would be welcomed by Fellows resident abroad and by those Fellows who live at a distance from London, as it would enable them to keep in closer touch with the activities of the Society than is possible under the present arrangement, by which the only intimation which they receive of these activities is that contained in the Proceedings, issued at intervals of six months.

'Under a scheme of this kind it would, moreover, be possible to arrange more frequently for the greater part of a particular General Meeting to be devoted to a discussion of some problem of general interest to entomologists.

'The Council have accordingly decided that there shall be circulated to every Fellow of the Society not later than the Saturday preceding the General Meeting on Wednesday, 2nd October, 1935, and on the Saturday preceding every subsequent General Meeting a notice containing particulars of communications and exhibits proposed to be made at that meeting, together with the draft of the minutes of the last previous General Meeting.

'It will be necessary for Fellows who propose to make communications or exhibits at General Meetings, and who deesire that a note of these should be included in the agenda to be issued before the meeting, to notify the Secretary of the proposed communication and exhibits not later than fourteen days prior to the date of the meeting. Where possible, these notifications should be accompanied by an abstract not exceeding 150 words of the purpose of the communication or exhibit.

'It is hoped that Fellows will co-operate by sending such notifications to the Secretary in order that the agenda to be distributed may be as complete as possible. It is not proposed, however, to alter the existing arrangement by which Fellows may also make communications to, and exhibits at, General Meetings, on signifying to the Secretary their intention of so doing before 12 noon on the day of the meeting concerned, though priority will be given at the General Meetings to communications and exhibits the titles of which have been included in the agenda circulated before the meeting.

'It has further been decided that all Fellows who propose to make exhibits at the General Meetings shall in future place their exhibits on view not later than 7 p.m. on the day of the meeting.

'By order of the Council.

'A. W. McKenny Hughes, Hon. Secretary.'

Sir Edward Poulton, F.R.S., exhibited and discussed (1) [on behalf of Mr. W. A. Lamborn] termites, inquiline larvae, cocoon and moth, recorded in Proc. Roy. Ent. Soc. Lond., February 2nd, 1935; (2) [on behalf of Mr. B. de Meillon] five female Fossorial wasps (*Trypoxylon lissonotum* Cam.) from compartments in the glass tube of a fountain-pen filler, 1933-34; (3) further notes on records of birds trained to catch butterflies; and (4) *Vermileo vermileo* de G. or sp.n. from larvae collected in South Portugal by Mr. Hugh Main. The larvae hibernated and the flies emerged on 1st and 3rd June, 1935.

Professor G. D. Hale Carpenter exhibited and discussed (1) a new *Planema-Pseudacraea* mimetic association from the Budongo forest, Uganda, illustrated with lantern slides; and (2) a living Dynastid beetle imported with bananas. Miss L. E. Cheesman discussed the origin of an island race in bees, illustrating her remarks with lantern slides. Mr. H. M. Edelsten discussed the effect of the frost on oak-feeding larvae.—A. W. McKenny-Hughes, *Hon. Secretary.*

## SOME NEW BRITISH SAWFLIES, WITH NOTES ON SYNONYMY, ETC. (HYMENOPTERA SYMPHYTA).

BY ROBERT B. BENSON, M.A.

In a recent paper published elsewhere Benson (1935), while dealing with the sawflies of the high mountains of Britain, eight additions to the British fauna were recorded: *Pontania polaris* Malaise, *Pteronidea forsiusi* (Enslin), †*P. nubium* Benson, *Amauronematus abnormis* Holmgren, †*A. mcluckiei* Benson, †*A. alsius* Benson, *Lygaeonematus carinatus* Hartig and †*Pristiphora asperlatus* Benson (the four species marked † being new to science). In addition to this, certain Cameronian species were in the same paper resurrected: *Pontania herbaceae* Cameron, *Pachynematus clibrichellus* Cameron and *Lygaeonematus carinatus* Hartig (=*pallipes* Cameron, *whitei* Cameron, *scoticus* Cameron, *breadalbanensis* Cameron and *astutus* Cameron). At the same time the British specimens heretofore recorded as *Pontania vesicator* Bremi were found to be *P. pustulator* Forsius, so that doubt was expressed whether *P. vesicator* Bremi is really British at all, and a new name, *Pontania robbinsi* Benson (named after the late J. C.

Robbins), was given to *P. femoralis* Zaddach, Cameron nec Zaddach.

In the notes that follow are a few more additions to the British list and a few alterations. In the Nematinae I am making the following changes: *Nematus* Panzer with *N. lucidus* Panzer as type (=*Pontania* O. Costa, *Pteronidea* Rohwer, *Holcocneme* Konow, *Hypolaepus* W. F. Kirby and *Dineura* Dahlbom); *Amauronematus* Konow with *A. fallax* Le Peletier as type (=*Brachycoluma* Enderlein and *Pontopristia* Malaise); *Pristiphora* Latreille with *P. testaceus* Jurine as type (=*Lygaeonematus* Konow and *Micronematus* Konow).

Further details of this scheme will be published elsewhere later; the advantages of it are that the genera will be much more easily definable and will contain only the minimum number of intermediates and exceptions.

The species below marked with an asterisk * are further additions to the known British fauna.

*Emphytus abdominalis* Le Peletier and *serotinus* Müller.

Enslin (1912-1918), under the species *Emphytus serotinus* Müller, gives three larval descriptions: (i) an oak-feeding larva on *Quercus cerris* L. after Kollar, which must certainly belong to a distinct though now unrecognisable species; (ii) an oak-feeding larva after Brischke, Vollenhoven, Cameron and others; and (iii) a rose-feeding larva after Carpentier and Loiselle. The last two refer, as already suggested by Stein (1929), to distinct species. The characters of the rose-feeding form, which I propose to call *E. serotinus* Müller (=*filiformis* Klug, vide Conde 1934 (i)), are taken from a series of the species bred by Stein (the first specimens seen were presented by O. Conde, and the others came to the British Museum more recently at the purchase of the Stein Collection); of the oak-feeding species, which I am calling *E. abdominalis* Le Peletier, I have been able to examine the series bred by Dr. R. C. L. Perkins, F.R.S.

*Emphytus autumnalis* Forsius, 1933, must be very close to, if not identical with, the dark form of *E. abdominalis* Le Peletier, while var. *temesiensis* Moćsary is intermediate between the dark and light forms. So far as I can see there are no structural differencs between these various colour forms.

The only form of *E. abdominalis* Le Peletier which is known to me in Britain is this yellow-bodied form which is generally to be met with flying round oak trees in September or October. The larvae are sometimes very abundant on oak in May and June.

Morice, however, 1903, p. 73, records 1♀ of the dark form taken by Mr. Harwood in Essex.

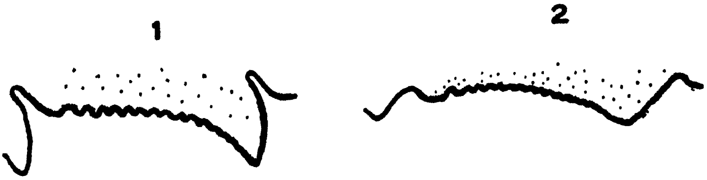
I should here say that three male specimens in the British Museum labelled by Stephens as '*filiformis*' belong to *E. braccatus* Gmelin. These presumably are the specimens referred to by him as from Darenth Wood (1835, pp. 90-91), but as he refers to them as well as to '*E. serotinus* Müller' ('in hedges and woods within the metropolitan district') and '*E. cereus* Klug' ('in Devonshire') as being found in June and July, it appears he had no personal experience with these late autumnal species in the field, and therefore they are suspect as being some of Dr. Leach's records.

The true *Emphytus serotinus* Müller, so far as I am aware, does not occur in Britain.

The two species can be distinguished thus :—

Abdomen yellow (except for tergum 1) in the type-form, but may be black marked (= *temesiensis* Mocsary) or entirely black (? *autumnalis* Forsius); antennae entirely dark in both sexes, and greater in length than a hind tibia together with its tarsal segments; labrum at apex sub-triangular; cheek about one-third the length of the pedicel; frontal area with the raised outer ring and inner depressed area shining and almost unpunctured; median fovea as a deep groove; mesopleura slightly punctured above; saw (fig. 1).

Larva on *Quercus* . . . *abdominalis* Le Peletier (= ? *autumnalis* Forsius).



Fifteenth tooth of the saw of (1) *Emphytus serotinus* Müller, (2) *E. abdominalis* Le Peletier. (Figure 1 is drawn from a slide lent by O. Conde.)

Abdomen all black except in neighbourhood of saw; antennae black in ♂, but in ♀ with a white ring covering the two or three penultimate segments, while in length the antenna is about as long as a hind tibia together with its tarsal segments; labrum at apex semi-circular; cheek about half the length of the pedicel; frontal area more tabular, less depressed in the middle, and dull with strong irregular rugulous puncturation; median fovea as but a slight rounded depression; mesopleura strongly punctured above; saw (fig. 2).

Larva on *Rosa* . . . *serotinus* Müller.

Both these species, on the hind legs, the femur and base of tibia, are reddish-yellow; the extreme apex of the femur and the tarsi are infuscate.

The other closely allied British species, *E. braccatus* Gmelin, can at once be separated from the above on the colour of the hind tibia, which is white on the basal third and infuscate brown to black at the apex.

### *Nematinus nigrosternatus Malaise.

In addition to *N. acuminatus* C. G. Thomson there appears to be another closely allied species in Britain, which agree with *N. nigrosternatus* Malaise, 1931, hitherto known only in Kamtchatka, E. Siberia. I am indebted to Dr. R. Malaise for the loan of the type of his species for comparison.

Dr. R. C. L. Perkins, F.R.S., has both species in his collection from Devonshire; the new one he bred from a larva on birch, which he described in a letter dated 7.v.1929 as a dark sooty or almost black creature, with regular transverse rows of white dots,' and he was puzzled that these larvae did not agree with the description given in Enslin after Stein, for *N. acuminatus* C. G. Thomson.

Now that the British Museum has purchased Stein's collection I have been able to compare Dr. Perkins' bred specimens with those bred by Stein. *N. nigrosternatus* Malaise can be distinguished in the female from *N. acuminatus* C. G. Thomson by the presence of three black marks, one on each of the mesonotal lobes, and the pale metanotum (in *N. acuminatus* C. G. Thomson the mesonotum is unmarked while the metanotum is strongly blackened), also by the broader sawsheath, excised apex of hypopygium and the different saw.

In addition to the series bred by Dr. Perkins, I have seen 1 ♀ in the Morice Collection labelled 'Ben Nevis, *Nematinus acuminatus,* det. Konow' (probably the specimen recorded by Morice, 1898, as taken near the summit of Ben Nevis by Dr. W. S. Bruce), and 1 ♀ in the Cameron Collection, from Argyllshire, Loch Awe. The species also occurs in Central Europe, as there is a specimen in the Stein Collection labelled 'Schwerin, vi.87'; Schwerin is in Mecklenburg, Germany.

### *Nematinus willigkiae Stein.

This species had been confused with *N. luteus* Panzer until Stein bred both forms from distinct larvae and described *N. williggiae* as a new species in 1926.

The larval description accredited to *N. luteus* Panzer by Enslin really belongs to this species.

The female can most readily be distinguished from that of *N. luteus* Panzer by the fact that in the forewing its subcosta (except at the two ends), the medius and the brachius are brown instead of black. The sawsheath viewed from above is also different, being smaller in size compared to the length of the cerci, and slightly contracted behind (instead of parallel-sided), with the lateral corners bearing longer hairs and with the apex only very slightly emarginate each side of the middle (instead of conspicuously emarginate). The species seems to be widely distributed in Britain, occurring on Alder together with *N. luteus* Panzer. I have examined material from the following localities :—

CORNWALL, Botusfleming (T. A. Marshall); DEVONSHIRE, Chudleigh, vi.29, Dartmoor, vi.23 and vi.21, Lustleigh, vi. 23 (R. C. L. Perkins); HAMPSHIRE, New Forest, vii.05 (F. C. Adams), Lyndhurst (E. F. Chawner); GLAMORGAN, Castell Loch, vi.30 (H. M. Hallett); ARGYLL, Cladich (P. Cameron); PERTHSHIRE, Rannoch (P. Cameron); INVERNESS, Nethy Bridge, v.05 (Yerbury in Morice Coll.), Aviemore, vii.03 (J. J. F. King); and SUTHERLAND, Bonar Bridge (P. Cameron).

### *Nematus fahraei* C. G. Thomson.

This species I am transferring from *Amaronematus* to *Nematus*, where it belongs in the *leionotus-mimus* group. Superficially it has the appearance of an *Amauronematus* because of its short dark antennae, but the mouth-parts show the long maxillary palp not found in *Amauronematus* and characteristic of *Nematus* (see Benson, 1935, p. 24).

### *N. collinus* Cameron (=*similis* Forsius) new synonomy.

### *N. flavescens* Stephens (=*stichi* Enslin) new synonomy.

My friend Dr. H. W. Miles has bred specimens of both these colour forms, together with intermediates, from larvae agreeing with the description in Enslin, p. 449, given for the larva of *N. stichi* Enslin.

### *N. jugicola* C. G. Thomson.

I obtained the second known British specimen of this species from a patch of *Salix repens* L. on the sand on the east end of Loch Morlich, Inverness-shire, 24.vi.1934. The previous British record was from the sands near Forres, Elgin.

### **Nematus kriechbaumeri* Konow.

I captured 2 ♀♀ apparently referable to this species on the banks of the River Gade at Water End, Boxmoor, Hertfordshire, 19.v.1934. The species belongs to the gall-making group and is supposed to be attached to *Salix incana* Schrank, but probably also to other *Salix* sp. It is most like *N. viminalis* L. of previously known British species, but its sawsheath is much broader and shorter, and the frontal area is less clearly margined at the side.

### **Pachynematus pullus* Konow.

One ♀ which evidently belongs to this species was taken in Staffordshire, Cannock Chase, 18.v.1931, by H. Britten. It is a small mostly black species, 5·5 mm. long, with parallel-sided unpunctured head, frontal area surrounded by a clear ridge and with a broad sawsheath rounded behind.

### **Pamphilius fumipennis* Curtis.

Curtis, 1931, described this species on the strength of some specimens collected in Norfolk, but ever since then it has been assumed that he was dealing with the common *P. silvaticus* Linné. Condé, 1934 (2), points out that there really are two species mixed up under *P. silvaticus* L., and that the new one fits very well with Curtis' description of *P. fumipennis*.

After diagnosing their differences, he goes on to describe the larva of *P. fumipennis* Curtis, which he bred on hazel (*Corylus avellana* L.), and to distinguish it from that of *P. silvaticus* L., which he bred on Mountain Ash (*Sorbus aucuparia* L.).

The adults differ from *P. silvaticus* L. in being slightly larger and in having the first antennal segment entirely yellow or slightly black at the base, instead of being entirely black above, in not having a yellow stripe stretching from the inner hind corner of each eye backwards to the hind margin of the temples, and finally in having the region (on the inner orbits of the eyes) separating the upper part of the face from the lower part strongly and coarsely wrinkled and rounded, instead of being but slightly punctured and bearing a conspicuous transverse keel as it does in *P. silvaticus* L. *P. fumipennis* Curtis does not seem to be so common in Britain as *P. silvaticus* L., but I have seen specimens as follows :—

BEDFORDSHIRE, Leighton, 1 ♀, B.M. 1907-185 (W. Crawshay); HERTFORDSHIRE, Berkhamsted, 1 ♀, 14.vi.1928, and Gaddesden, 1 ♀, 25.vi.1933 (R. B. Benson); also 1 ♂ in the British Museum without data.

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*August 1st,* 1935.

*Swarming of Xyela julii Bréb.*—According to Enslin, *Xyela julii* Bréb. is sometimes found swarming in Central Europe, but so far as I am aware is generally taken singly in this country and has never before been found swarming. On 4.v.1935, in the evening sunshine at about 6 p.m., my wife and I collected twenty-five ♀♀ and twelve ♂♂, all off birch catkins (mostly from one side of one tree) except one ♀ that was on pine, at Chipperfield Common, near King's Langley, Hertfordshire. Although frequently found on birch catkins, it is, I believe, never taken far from pine, and though I have searched for it in extensive birch growths I have never taken it except where pine was near at hand. The larva is not yet known, but the larva of the closely allied North American species, *X. minor* Dyar, feeds on pollen in the staminate flowers of pine; they leave the flowers before they blossom and drop to the ground, where they form deep earthen cells (Dyar, 1898*).—R. B. BENSON, Department of Entomology, British Museum (Natural History): *August 30th,* 1935.

*New localities for Cis bilamellatus Wood.*—The range of this curious little fungus-feeder appears to have extended in recent years in a noteworthy degree. On July 19th, 1933, I met with it not rarely in dry fungus on a dead beech on Mickleham Downs; and at Woking on the 4th of the present month a specimen of each sex was found, in company with *Tetratoma fungorum* Fab., in a small *Polyporus* on a dead lime-tree alongside one of the main roads. At the end of September my friend Mr. J. Collins took several examples at Wytham Park, Berks, in decayed *Polyporus betulinus*; and it has also occurred recently in Windsor Forest to Mr. H. St. J. Donisthorpe. It is now probable that *C. bilamellatus* will be found widely distributed under suitable conditions in the south of England.—JAMES J. WALKER, Oxford: *October 18th,* 1935.

*Polygonia c-album in Cambridge.*—On September 25th last an individual of the above species, in good condition, was seen by me in my garden. It was flying along a flower border, and ultimately settled on a fence with its wings outspread.—A. D. IMMS, Zoological Laboratory, Cambridge: *October 12th,* 1935.

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* 'Notes on some sawfly larvae, especially Xyelidae,' Canad. ent., 30, p. 176.

# SYSTEMATIC NOTES UPON BRITISH AQUATIC COLEOPTERA.

BY FRANK BALFOUR-BROWNE, M.A. (OXON ET CANTAB., F.R.S.E., F.Z.S., F.R.E.S., P.R.M.S.),
(formerly Professor of Entomology at the Imperial College of Science, London).

## PART IX. *COLYMBETES, DYTISCUS, HYDATICUS, ACILIUS AND GRAPHODERES.*

It has already been stated that Clairville (1806) not only created and described the genus *Colymbetes* but also named two 'representative species,' *striatus* Fab. and *fuscus* Fab. Both these species were originally described by Linnaeus (1758), the former as 'D. fuscus, elytris transverse subtilissime striatis,' the latter as 'D. fuscus, elytris transverse substriatis,' Fabricius (1792) slightly improving upon this meagre description by 'D. fuscus thorace flavo fascia abbreviata nigra . . .' for *Dyt. striatus* and by 'D. fuscus thoracis margine flavo . . .' for *Dyt. fuscus*. Early English Coleopterists such as Stephens (1828), and Wilson and Duncan (1834) described both these species as occurring in Britain and it was at this period that Curtis (1828) made *Dytiscus striatus* Linn. the genotype, Hope (1838) doing the same. It seems clear that what these authors recognised as *striatus* were the smaller specimens, perhaps the males, of *fuscus*, since there is no evidence that the real *striatus* has ever occurred in these Islands so that the question arises as to whether the genotype is to be fixed by the name used or the species intended. On enquiry, I find that there is no rule on this point but that the practice has been to recognise as the genotype the actual species seen regardless of the fact that the author misnamed it. To my mind, this is not common sense, and although in this case it is easy to identify the species which was misnamed, it cannot be assumed that it will always be so. Even if it were, the one name has been in print as that of the genotype and it seems absurd that such name should be always liable to be changed if it is later discovered that the author was looking at some other species. Seeing that the whole object of fixing the genotype is to establish the name permanently, the described practice stultifies this, and I propose to bring the matter to the notice of the Nomenclature Committee of the Royal Entomological Society of London with a view to having it discussed and passed on to the International Commission for a definite ruling. Thus, for the moment, I only repeat that *Dytiscus striatus* Linn. has been named by Curtis as the genotype.

In 1758, Linnaeus introduced *Dytiscus*, which at that time included all or nearly all the known Hydradephaga. It is curious that although ' Dyticus ' would be the correct spelling of the word derived from the Greek, it was not until 1762 that Geoffroy made the alteration which, however, under the rules of nomenclature, must remain a synonym. The genus attained its present form betweeen 1802 and 1828. Latreille (1802 and 1804) produced *Haliplus* and *Hygrobia* (*Pelobius* of Erichson (1832)) ; Clairville (1806), *Noterus, Hydroporus* and *Colymbetes ;* Illiger (1807), *Hyphydrus ;* Leach (1817), *Laccophilus, Agabus and Hydaticus,* most of the other genera being the result of divisions of one or other of these. In 1860, Thomson divided the genus into two, *Dytiscus* with *latissimus* Linn. and Macrodytes with the remaining species. In allocating the names he possibly relied upon the fact that Hope (1838) had named *latissimus* as the genotype of Dytiscus. But Latreille (1810) and Curtis (1826) had already made *marginalis* the genotype so that in any case Thomson's names cannot stand, either for separate genera or for subgenera, as they are now used by most authors. As *latissimus* is not a British species, there is no necessity to consider the question as to whether it is entitled to a subgenus, as the name *Dytiscus* is the correct one for all our species, both as a genus and as a subgenus.

Of the six British species, no question arises as to the nomenclature except with regard to one which in Fowler (1887) is given as *D. punctulatus* Fab. There appears to be no doubt but that Müller's *' semisulcatus '* described by him from a female in 1776 is the same species and it is difficult, therefore, to understand why almost every subsequent author has either ignored Müller or used Fabricius' name, which was published a year later, and given *semisulcatus* as a synonym. Bergstrasser (1778), Schrank (1798), Blunk (1910), Zimmermann (1917, 1919 and 1920) and Guignot (1933) are some or all of the few who have followed the law of priority while Paykull (1798), Marsham (1802), Stephens (1828-9 and 1839), Wilson and Duncan (1834), Erichson (1839), Murray (1853), Sharp (1882), Bedel (1881), Seidlitz (1886), Ganglbauer (1892), Everts (1898), Reitter (1906), and Des Gozis (1910) have all ignored it. The British list is therefore :—

*Dytiscus* Linnaeus, Systema Naturae, Ed. 10, I, 1758.
    *semisulcatus* Müller, Zoologiae Danicae
        Prodromus, 1776 = *punctulatus,* Fab.
    *marginalis* Linnaeus, 1758.
    *circumflexus Fabricius,* 1801.
    *circumcinctus Ahrens,* 1811.
    *lapponicus* Gyllenhal, 1808.
    *dimidiatus* Bergstrasser, 1778.

*Hydaticus* is a large genus with only two representatives in the British Islands, the names of which have not been in dispute :—

*Hydaticus* Leach. Zoological Miscellany, III, 1817.
*transversalis* Pontoppidan, Danske Atlas, I, 1763.
*seminiger* De Geer, Mem. Hist. Ins. IV, 1774.

The range of both these species is very limited, *transversalis* having only been recorded from eleven or twelve English counties and vice-counties, Yorks Mid-West (Askham Bog) being the farthest north. *Seminiger,* also, only reaches as far north as Askham Bog, other records being for Cheshire, Salop, Berks, Surrey, Middlesex, Kent West, Sussex East and Hunts, Cambs and Norfolk West. Recently, however, I have seen a specimen from North Kerry and therefore it possibly has a wider range in Ireland than this record indicates. Curtis (1825) made *Dytiscus transversalis* the genotype and Hope (1838) so named the other species, which at that time was known as *H. hybneri* Fab. By the rule of priority the former is fixed as the type.

Of the two British species of *Acilius,* no question arises with regard to *sulcatus* Linn., which was the only species placed in the genus by Leach (1817) and is, therefore, the genotype. The second species appears in Fowler (1887) as *fasciatus* De Geer with the synonym *canaliculatus* Nicolai, but, although the latter author named his species 48 years after De Geer, most of the continental authors use Nicolai's name. Now the external differences between the two species are very slight, the easiest way of separating them being on size, *sulcatus* being larger than the other, and on the fact that whereas *sulcatus,* in both sexes, has the basal half of the posterior femora black and pitchy, the other species has these femora testaceous throughout. Also, in the female *sulcatus* there are two patches of rather long testaceous hairs on the pronotum and these are absent in the other species. When, therefore, we examine De Geer's description of his *fasciatus* we find no mention of any of these distinguishing points and what he says in one short sentence in French and repeats in Latin, suits either species equally well. Moreover, in the synonymy, he gives a reference to *Dytiscus sulcatus* Linn. and also to *Dytiscus cinereus* Linn., the latter being our *Graphoderes cinereus,* so that it seems clear that we cannot accept *fasciatus* as the name of our smaller species and that *canaliculatus* Nic. is correct. The British species, are, therefore :—

*Acilius* Leach, Zool. Misc. III, 1817.
*sulcatus* Linnaeus (1758).
*canaliculatus* Nicolai (1822).

*Graphoderes* was taken out of *Hydaticus* by Thomson (1860) although the name first appeared as 'Graphoderus, Eschscholtz' in Dejean's Catalogue (ed. 3) (1833) where, being without a description, it is a 'nomen nudum' and cannot be used. It is therefore rather extraordinary that the genotype was fixed by Hope, who in The Coleopterists' Manual (1838) gives '*Graphoderes* (*sic*) Esch. France *Dyt. cinereus* Linn.' This species has only been recorded for three counties or vice-counties in Britain, but there are actually only two definite records of its occurrence. Stephens (1828, p. 86) says 'Two specimens, ♂ and ♀, only of this insect have yet been taken in Britain; they occurred "the beginning of June, 1825, at Whittlesea Mere" Messrs. Chant and Bentley.' I took the species in 1904 and 1905 in East Norfolk (see Trans. Norfolk and Norwich Nat. Soc., Vol. VIII). Hamlet Clark (1855) gives 'Cambridge and Huntingdon Fens,' but mentions no specific occurrence.

This would complete my notes on the Dytiscidae but for the fact, recently pointed out to me, that I have omitted three genera, *Hydrovatus*, *Bidessus* and *Hyphydrus*. I will therefore deal with them in due course and complete my notes on the Hydradephaga with the Haliplidae and the Gyrinidae.

In the October number, Part VIII of my Systematic Notes, there is a misprint at the bottom of p. 225 where '*graphii*' should read '*grapii*.' On p. 226 there are two mistakes. In Section 5 of the diagnostic table, last line, read 'in front' instead of 'behind,' and in the script to Fig. 28 read '(b) *R. bistriatus*' instead of '*pulverosus*.'

Winscombe Court, Winscombe, Somerset.
*October 8th*, 1935.

## *BAGOUS FRIT* HERBST. IN BRITAIN, WITH NOTES ON SOME OTHER SPECIES OF THE GENUS.

BY K. G. BLAIR, D.SC., F.R.E.S.

Though this name is familiar enough on British lists, having already been applied to two different species of the genus, Mr. Philip Harwood now sends me a species so named by Mons. A. Hustache that differs from any British species hitherto known to me, at the same time asking me to bring it forward as a British species.

**Moderately elongate, the antennae inserted well before the middle of the rostrum; thorax scarcely transverse, rather sharply granulate with a well-defined anterior collar and median furrow, the sides behind the collar subparallel; elytra nearly twice as long as wide, with a depression around the suture and another on either side of the suture before the middle, the sutural stria more**

deeply impressed than the others, causing the suture to be slightly elevated, especially behind, the alternate interstices—third, fifth, etc.—also somewhat raised and bearing a series of rather distantly placed curved setae, apex rather produced; tibiae slender, posterior tarsi with the second and third joints shorter than the first, of equal length and thickness, about as long as broad. Length, from front of eyes to tips of elytra, 3 mm.

Taken in some numbers by Messrs. P. Harwood and E. C. Bedwell at Studland, Dorset, and in the New Forest, Hants; also by H. Donisthorpe at Sutton Broad, Norfolk (recorded as *B. diglyptus* Boh.).

In Newbery's key (1902) it would run to *lutulosus* Gyll., from which it differs in its considerably larger size and slender tibiae. It is also near *collignensis* Hbst. (*claudicans* Boh.) which, however, has the elytra shorter, more evenly convex and without the depressed areas; the tarsi are longer and more slender.

The identity of *B. frit* Herbst has long been a cause of confusion not only to British Coleopterists but also on the Continent, but this question has recently (1930) been ably reconsidered by J. Neresheimer and H. Wagner, who have been able to examine types of Herbst, Gyllenhal, Boheman and Thomson, and it seems well that we should adopt their conclusions and thus fall into line with modern Continental usage. Following this course, *B. frit* of Fowler, Vol. V, becomes *collignensis* Herbst (*claudicans* Boh.), while *frit* of Newbery (1902), Sharp (1917) and Hudson Beare (1930) is *subcarinatus* Gyll. The same course necessitates certain other changes, thus *collignensis* Hbst. of Sharp and Hudson Beare (*glabrirostris* var. of Newbery) is *puncticollis* Boh., *collignensis* Herbst replacing *claudicans* Boh.; *lutulentus* Gyll. supplants *nigritarsis* Thoms. (Newbery, Sharp and Beare) and is not synonymous with *glabrirostris* Herbst as considered by Sharp. *B. binotatus* Steph., which these authors are unable to recognise from the description, is left by them as a synonym of *glabrirostris*, but the single specimen with this name in the Stephens collection is *lutulentus* Gyll. (*nigritarsis* Thoms.).

In this preliminary paper these authors have not dealt with *tempestivus* Herbst. For the British species going by this name Sharp and others have used *cnemerythrus* Marsh. (1802), but this is an error. Not only does the description of *cnemerythrus* not apply to any species of *Bagous*, but the specimen in Kirby's collection upon which Marsham described the species (i.e. the type) is a much abraded example of the species usually known as *Tychius venustus* F. (1781).*

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* Type in Banks Coll. in Brit Mus. There are two specimens of *Curculio venustus* in the Banks Collection, one lacking head and thorax, but both are undoubtedly *Phytonomus trilineatus* Marsh. (No. 90) which name will have to be replaced by *venustus* F. (Spec. Ins. I. 1781, p 170). For the *Tychius* the oldest available name would appear to be *parallelus* Panz Faun. Germ. 21.5.(1794).

Schönherr, Gen. Curc., VIII, 2, 1845, p. 83, redescribed *cnemerythrus* Marsh. on specimens sent to him by Walton and Spence, but G. R. Waterhouse, 1859, followed by Gemminger and Harold's Catalogue, ascribes this species to *tempestivus* Herbst, and not Marsham's species. Waterhouse also cites the name as a synonym of *Lyprus cylindrus* Payk. in the Kirby collection, but I am unable to find any such specimen now in that collection. Our best course, at least for the present, will be to continue to use *tempestivus* Herbst.

The Marshamian specimen (type) of *Hydronomus alismatis* in the Stephens Collection bears the usual white label with Marsham's number beneath. In this case the number is incorrectly given as '92,' i.e. the number of *cnemerythrus,* instead of '108,' the number of *alismatis.* This fact no doubt accounts for Waterhouse in synonymising the Stephensian species giving '*cnemerythrus* var. β,' though no such variety was mentioned by Marsham, as a synonym of *H. alismatis* Marsham.

*B. tibialis* Steph. (1831, p. 48) appears to have dropped out of the catalogues, and I am unable to find any specimen so named in the Stephens Collection. In the 'Manual,' 1839, however, he notes as a synonym *B. Beckwithii* Kirby, MSS., and the specimen bearing this name in Kirby's collection is *Pseudostyphlus pilumnus* Gyll. As Stephens' description would fit this insect I think this synonymy may be assumed.

It may also be noted that of the new genera proposed by Sharp (1917) *Abagous* and *Probagous* are retained as subgenera of *Bagous. Parabagous,* proposed for *B. subcarinatus* Gyll. (*frit* in error), is invalid, the name being preoccupied by Schilsky (1907) for another group. Neresheimer and Wagner do not separate this species from *Bagous* s.s., so that the name may be allowed to lapse.

Together with the examples of *B. frit* Mr. Harwood also sent a specimen determined by Hustache as *longitarsis* Thoms. This, however, is *B. tomlini* Sharp, from the type locality, Romney Marshes. Thomson's name will therefore have to tak[illegible]riority.

A list, complete to date, of the British Bagoinae will perhaps help to make these changes clearer.

*Ephimeropus* Hochh. 1847.
*Elmidomorphus* Cuss. 1851, Sharp 1917.
*petro* Herbst.
*aubei* Cuss., Sharp.

*Bagous* Schönh. 1826.
  s.-g. *Lyprus* Schönh. 1826.
    *cylindrus* Payk.

  s.-g. *Bagous* s.s.
    *binodulus* Herbst.
    *nodulosus* Gyll.
    *argillaceus* Gyll.
    *limosus* Gyll.
    *brevis* Gyll.
    *subcarinatus* Gyll.
      *frit* Newb., Shp. (nec Herbst).
    *arduus* Sharp.
    *longitarsis* Thoms.
      *tomlini* Shp.
    *collignensis* Herbst.
      *claudicans* Boh. Newb., Shp.
      *frit* Fowl. V. (nec Herbst).
    *frit* Herbst.
    *lutulosus* Gyll.
    *diglyptus* Boh.

  s.-g. *Probagous* Sharp, 1917.
    *tempestivus* Herbst.
      *cnemerythrus* Boh. (Sharp, nec Marsh.).
      v. *angustulus* Thoms. (*angustatus* Sharp in error).
    *heasleri* Newb., Sharp.

  s.-g. *Abagous* Sharp, 1917.
    *lutosus* Gyll.
    *lutulentus* Gyll.
      *binotatus* Steph.
      *nigritarsis* Thoms., Newb., Sharp.
    *rudis* Sharp.
    *puncticollis* Boh.
      *collignensis* Hbst. (pars), Sharp.
      *glabrirostris* var. Newb.
      *glabrirostris* var. *major* Fowl. (1913).
    *glabrirostris* Herbst.

*Hydronomus* Schönh. 1826.
    *alismatis* Marsh.

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British Museum (Natural History),
Cromwell Road, London, S.W.7.
*August 21st*, 1935.

## NOTES ON TORTRICIDAE.*

BY G. L. HEY.

1. *Batodes angustiorana* Haw., Lep. Brit., p. 429 (1829).
=*rotundana* Haw., l.c., p. 429.
=*dumeriliana* Duponchel, Hist. Nat. Lep., Vol. 9, p. 564, Pl. 266 (1836).
=*Ditula angustiorana* Haw.

Fairly widely distributed in Britain, parts of Southern and Central Europe and in some parts of Asia Minor and North Africa (2, 11, 12, 14). The writer has bred it from larvae obtained from Cambs., Devon, Herts., Kent, Norfolk, Somerset, Sussex and Worcs. Recorded once in America (10). Feeds on foliage of apple, apricot, damson, larch, laurel, oak, palm, pear, plum, privet, rhododendron, vine and yew (2, 4, 5, 6, 7, 11, 12, 13, 14). Also on fruits of apple, damson, pear, plum and vine (1, 3, 7, 9, 13, 14). May be a serious pest in fruit orchards, vinerics, apple stores and on rhododendrons. In fruit orchards generally occurs in conjunction with other species, frequently with *Cacoecia podana* Scop. and *Spilonota ocellana* Fab., these species, especially the former, generally greatly outnumbering *Batodes* (7, 8).

Eggs laid in batches of about fifty per egg-mass, they are almost identical with those of *C. podana*, except that those of *Batodes* appear to be generally paler in colour. Moths generally recorded in July and August, but the writer has found the moth in Kent more commonly in June than in July and has never taken it in August.

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* These notes are intended to make available to other workers the findings of the writer, who has been breeding out Tortricidae intermittently for the last seven years. They are necessarily very incomplete; only the more important references are given. Part of the work was carried out whilst the writer was working at the School of Agriculture, Cambridge, part at East Malling Research Station and part elsewhere.

Eggs laid on upper surface of leaf, hatch in two to three weeks. In 1934 first egg-mass found in Kent on June 20th; in another orchard first instar larvae on June 22nd.

Larva overwinters as third instar in silk cocoon on tree; next spring, after feeding and moulting three or four times, it pupates between rolled leaves in the sixth or seventh instar. In almost all respects life-history appears identical with that described by Hey and Thomas for *Cacoecia podana* Scop.; both species damage fruit buds in spring and fruit on the tree and in store in autumn (7, 8). The pupa of *Batodes* is much smaller than that of *C. podana* and is nearly always rich chestnut brown in colour, never black and very rarely (except in bred specimens) pale brown.

The first instar larva when newly hatched has body pale yellow; head black or very dark brown, shining; thoracic plate posterior half distinct, grey, not pale, but the anterior half is pale and not distinct from rest of body; legs pale, mouth parts brown; body with pale hairs After moulting, the now second instar larva eats the first instar head capsule; this the writer has now observed also in *C. podana.*

Second instar larva of *Batodes* is distinct yellow colour; head shining, pale wax to pale brown to grey-brown, variable, but never dark brown or black. In *C. podana* second instar the head is always dark brown to black. The thoracic plate in *Batodes* in this and in all succeeding instars is pale light brown, or pale red-brown, with a paler band on the anterior margin, while in *C. podana* it is, except in the first instar, always much darker brown. The epicranial sutures in *Batodes* are red-brown, in *C. podana* they are deep black (8).

In the third instar the dorso-lateral margins of the thoracic plate are dark brown or black. Frequently in this and the preceding instar there is a black rod-like mass, lying apparently inside the head capsule, just behind the ocelli. The ocelli are black and show up conspicuously on the paler head capsule. The antennae are pale at base, darker at apex; the anal plate variable, light brown to pale wax, with paler areas; legs pale, except tarsi, which may be almost dark brown. Body colour variable, pale grey-brown to grey-green, with pale hairs rising from raised, pale, wrinkled areas, with a darker spot in centre at base of hair. Specimens taken from overwintering cocoons or others which have not fed for some time may be golden-yellow in colour without green or brown tints.

The following parasites have been bred by the writer: *Apanteles longicaudis* Wesm., *Apanteles* sp., *Macrocentrus abdominalis* Fab. and *Actia pilipennis* Fln., all larval parasites. The percentage of parasitism appears to be even lower than in *C. podana* (8).

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One Tree House, Church Road,
Leyland, Lancs.
*September 2nd,* 1935.

# *ASTICHUS ARITHMATICUS* FÖRST. AND *APHANOGMUS FUSCIIPENNIS* THOMS., TWO SPECIES OF HYMENOPTERA PARASITICA FROM WINDSOR FOREST NEW TO BRITAIN.

BY HORACE DONISTHORPE, F.Z.S., F.E.S., ETC.

On September 25th last, when in Windsor Forest, I collected some of the fungus *Reticularia lycoperdon* Bull., which was growing on a large felled oak. On breaking it up over paper, it was found to contain three specimens of the little beetle *Aspidiphorus orbiculatus* Gyll. (Col. Sphindidae), about a dozen *Sphindus dubius* Gyll. (Col. Sphindidae), and two small parasites; one a lovely little Chalcid, *Astichus arithmaticus* Först., the other a Proctotrupid, *Aphanogmus fusciipennis* Thoms., both of which are new to Britain.

The Chalcid has been recorded from France as parasitic on certain species of *Cis*. The family Cissidae comes next to the family Sphindidae in the European Catalogue of Coleoptera.

Mr. Nixon tells me that very little is known about the Proctotrupid, but it has been taken in Sweden.

It is probable that both species are parasitic on the *Sphindus*, as perhaps the *Aspidiphorus* is too small. Both these beetles are confined to the fungus *Reticularia lycoperdon*.

I am indebted to M. Férrier for the name of the Chalcid and to Mr. Nixon for the name of the Proctotrupid, neither species being in the British Museum collections.

These two species bring the total number of insects, etc., new to Britain, which I have taken in Windsor Forest, up to forty-eight.

Department of Entomology,
British Museum (Natural History).
*October 8th*, 1935.

# NOTES ON BRITISH SIPHONAPTERA.

BY GORDON B. THOMPSON.

(Department of Entomology, British Museum (Natural History).)

Having published a revised list of the British Siphonaptera (1935), I feel that some notes are necessary in order to explain some of the changes in the nomenclature. It is regrettable that there were three errors in the revised list and also that the records of mammal parasites, in which I used part of the old nomenclature, was not published until after the list. The latter paper was, however, written long before I commenced work on the list. The errors may be corrected without delay: the species of *Orchopeas* should be *wickami* instead of *wichami,* the date of publication of Rothschild's *insularis* should be 1906 instead of 1908 and the date of publication of Dale's *gallinulae* should be 1878 instead of 1787.

The old genus *Ctenocephalus* Kolenati (1859) is replaced by *Ctenocephalides* Stiles and Collins (1930), as the former name is preoccupied.

Descriptions of the new genera *Malareus, Nosopsyllus, Megabothris* and *Orchopeas* and a key for their separation will be found in Jordan's paper (1933).

In the genus *Ceratophyllus* the name *waterstoni* was proposed by Jordan (1925) for *rothschildi* Waterston, as the latter name is preoccupied by *rothschildi* Rainbow (1905).

The name *insularis* Rothschild (1906) is applied to the form of *C. vagabunda* Boheman (1866) occurring in the British Isles. The British specimens differ from the true *vagabunda,* which is an Arctic species, in having the distal portion of the ninth sternite of the male much narrower.

*Malareus penicilliger* Grube (1852) = *C. mustelae* Dale (1878).

*Megabothris turbidus* Rothschild (1909) = *C. mustelae* Wagner (1898) *nec C. mustelae* Dale (1878).

The name *nobilis* Rothschild (1898) proposed for the form of the species *Ctenophthalmus agyrtes* Heller (1896) which occurs in the British Isles must be used instead of *celticus* Jordan and Rothschild (1932), because, as pointed out to me by Dr. Jordan (in correspondence), the name *nobilis* was based on pathological specimens, but as it was the first name given to a British specimen it is valid according to the rules of nomenclature.

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British Museum (Natural History),
Cromwell Road, London, S.W.7.
*October 1st,* 1935.

# A NOTE ON PRELIMINARY WORK ON ATTRACTANTS FOR CABBAGE ROOT FLY (*HYLEMYIA* (*CHORTOPHILA*) *BRASSICAE* BCHE.) AND CARROT FLY (*PSILA ROSAE* L.).

BY J. E. M. MELLOR AND R. M. WOODMAN.

With the object of finding an attractant which could be mixed with an insect poison to form a poison-bait to be scattered amongst the crop with a view to attracting and killing a proportion of female flies before they had oviposited, the following substances were tried during the summers of 1932, 1933 and 1934. (1) Moist casein, (2) geraniol, (3) butyl alcohol, (4) steam distillate of carrots and (5) of carrot tops, the same (6) of parsnips and (7) of parsnip tops, (8) yeast, (9) coumarin, (10) hexachlorethane, (11) oleic acid, (12) cheese, (13) vanillin, (14) glycine, (15) urea, (16) ethyl acetate, (17) glycerol (the five last as 0·5 per cent., 0·5 per cent.. 5 per cent., 3 per cent. and 10 per cent. aqueous solutions respectively), (18) oil of aniseed, (19) allyl mustard oil, (20) allyl sulphide (as extracts got by shaking large volumes of water with a few drops of the respective chemicals), (21) sodium arsenite mixed with treacle and bran as used for locust bait in the Sudan and Egypt,* (22) the same plus hexachlorethane, and (23) the same plus allyl mustard oil.

The substances were put into small tins placed below ordinary wire balloon fly-traps and set out in fields infested with cabbge-root fly and carrot-fly. In 1934 each baited trap had an empty control trap near it—six baited and six control traps being used for each attractant. No carrot-flies were taken by any of the traps. Attractants (8) to (23)—except (12) cheese—all caught *H. brassicae*; and *H. cilicrura,* the corn-seed maggot-fly, was taken in all baited traps except those containing (15) urea. Hexachlorethane alone took *Anthomyia pluvialis,* no other bait attracting this fly. Yeast proved to be definitely by far the most attractive to *H. brassicae* and *H. cilicrura,* and was followed by allyl mustard oil and glycine.

More female were attracted than males, and many of these were full of eggs, viz. on May 30th, 1934, 13 female cabbage-root females taken over yeast were found to contain between them 519 eggs, of which 109 were either fully or nearly fully developed.

A number of beetles were taken in the traps. Aniseed oil, glycerol, and coumarin took most, and *Calathus ambiguus* Payk. (*fuscus* F.) was more frequently found than any of the others.

The numbers of insects taken were too small to justify a more detailed account, but it seemed desirable to record the attractive-ness of yeast to the cabbage-root fly and the corn-seed maggot, and that hexachlorethane seemed to be chemotropic to *Anthomyia pluvialis*.

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* Mellor, J. E. M., Preparation and Application of Arsenite of Soda Bran Bait (Khartoum Formula) for use against Locusts and certain Grasshoppers Ministry of Agriculture, Egypt Plant Protection Section, Entomological Research Division. Leaflet No. 4. Government Press, Cairo, 1929.

The authors are indebted to Mr. J. E. Collin for the identification of the flies and to Mr. K. G. Blair for that of the beetles.

Alpha Cottage,
Trumpington, Cambridge.
*August* 10*th*, 1935.

*A seaside beetle* (*Anoncodes melanura*) *in London*.—Reverting to the notes of Mr. Haines (September) and Mr. H. Langford-Lewis (August) which appeared in recent issues of this Magazine under the above heading, I agree that the topic is certainly one of general interest. Complying with the request for other collectors' experiences, I should like to mention that when I lived in London we used to meet with this insect in numbers crawling on the pavement in the neighbourhood of Vauxhall Station and Wandsworth Road in the S.W. district in mid-July. This occurred in several successive years between 1930 and 1934.—C. McKechnie-Jarvis, 77 Woodholm Road, Ecclesall, Sheffield, 11: *September* 25*th*, 1935.

*The nuptial flight of Hylesinus fraxini Panz*.—On May 5th, while resting on the sheltered side of a faggot-stack about 5.30 p.m. (S.T.) we noticed a cloud of small insects dancing up and down like a swarm of *Chironomus*, only much more quickly. Every now and then a larger insect flew through the swarm and was pursued by some of the insects. We managed to catch a few, and found they were *Hylesinus fraxini* ♂ ♂. The larger insects observed were observed were evidently ♀ ♀. On examining some ash logs which had been cut two months previously we found hundreds of the beetles boring their way into the bark.—H. M. Edelsten, Bramble Hill, Balcombe, Sussex: *September*, 1935.

*A daylight flight of Corixidae*.—On Sunday, October 6th, I saw flying over the River Colne, Herts, what appeared to me to be a large swarm of flies. On catching some of the insects they turned out to be a species of bug, belonging to the Corixidae. They flew only in sunshine, and as soon as the sun was hidden fell down onto the water and immediately dived beneath the surface. According to Butler (Biol. British Hemip.-Heterop. 1923, p. 569) this diurnal flight is unusual, migration generally taking place at night.—S. J. Turpin, 3 Victoria Mansions, Willesden Green, N.W.10: *October* 9*th*, 1935.

*Hemiptera-Homoptera in Dumfriesshire*.—The following Homoptera, selected from last year's captures, supplements the list given in this Magazine (Vol. LXX, p. 263). *Idiocerus lituratus* Fall. was taken freely from sallows in August. *I. fulgidus* Fab. is rather rare. *I. confusus* Flor is common on sallows on Newton Moss and elsewhere in the county. *Bythoscopus rufusculus* Fieb. locally common on birches. *Acocephalus tricinctus* Edw., two ♂ ♂ swept on Newton Moss in July. *A. albifrons* L., both sexes are fairly common and generally distributed. On September 19th ♀ ♀ were beaten in numbers from rough grass on the marsh here, but no ♂ ♂ were taken on this occasion. *A. flavostriatus* Don., one swept from rushes in July. *Deltocephalus punctum* Fln., two swept in July on a peat-moss. *Athysanus grisescens* Zett. occurs occasionally by general sweeping. *A. lineolatus* Brullé (*obscurellus* Kbm.) I have taken sparingly at Browhouses and near Springfield. *Thamnotettix subfusculus* Fall. occurs at Nutberry and Newton Moss on various trees. *T. sulphurellus* Zett., common in autumn. *Cicadula sexnotata* Fall. locally common in moist locations. *Cixius pilosus* Oliv. is common on trees and bushes, while *C. similis* Kbm. seems to frequent low herbage on marshy ground. *C. nervosus* L. is frequent in the sweeping net. *C. brachycranus* Scott I have taken on Nutberry Moss in summer. *Delphax difficilis* Edw. common. *D. pellucida* Fab. is said to be common, but I have only two specimens from Newton Moss. *D. discolor* Boh. common. *Stiroma albomarginata* Curt., odd specimens only, swept from rough hedge banks. *Psyllopsis fraxini* L. fairly common but local on ash in July and August. *Psylla melanoneura* Först. common on hawthorn in May. *Trioza velutina* Först., I meet with one or two each year, generally on nettles. JAS. MURRAY, 6 Burnside Road, Gretna: *September 20th*, 1935.

*Notes on the vertical distribution of some Heteroptera in the Austrian Tyrol.*—At the beginning of June, 1935, I made a small collection of Heteroptera in the Austrian Tyrol, partly at St. Anton-am-Arlberg and partly in the Oetzthal. The season was unusually late, and much snow was lying above 6,000 feet. At St. Anton (4,400 feet) and at Umhausen (3,450 feet) in the Oetzthal, where haymaking had already begun, the most abundant bugs were the Capsids *Stenodema holsatum* F. and *Lygus pratensis* L., which could be swept up in scores in the meadows. All the examples of these species taken were of the varieties *dorsalis* and *rutilans* respectively. *Lygus kalmii* L. occurred sparingly at St. Anton, where in the luxuriant herbage at the riverside *Syromastes marginatus* L. was common and the Pentatomids *Zicrona coerulea* L. and *Carpocoris melanocerus* Mls.R. were frequently taken by sweeping. *Elastomucha grisea* L. was beaten from birch trees in the same place. In the forests above St. Anton, up to 5,500 feet, *Aphanus phoeniceus* Rossi was the most generally distributed heteropteron, and could be seen running actively over the ground whenever the sun shone. The related species *A. pini* L. has been described by Ekblom (Zool. Bidtg. Uppsala. 10.1926) as a seed-eater. If this is the case with *A. phoeniceus* also, we have some explanation of how this species can exist in the high forest before insect and plant life have reached their full abundance, since in spring the ground is covered with the seeds of the previous year. Hofmänner (Revue Suisse de Zoologie, 32.1925) has pointed out how the forest boundary marks off the upper limits of the range of the Heteroptera of the Alps; and he remarks that of the twelve species that commonly occur above the tree-line, only three are strictly alpine forms. Of these I took one—the beautiful Pentatomid *Eurydema fieberi* var. *rotundicolle* Dhnn., which occurred in the Oetzthal at about 6,500 feet, creeping over stones which had only recently been exposed by the thaw. A species which, though not strictly alpine, appeared to range higher still was *Sehirus dubius* Scop., which was taken several times on stony ground among melting snowdrifts. It is said to live entirely on *Thesium*, but the plant was not visible at the time of my visit. Another bug which occurred above 6,500 feet was the Lygaeid *Trapezonotus arenarius* L. This species affected dry, stony places, and its range was evidently determined more by suitable environment than by altitude.

Of aquatic bugs, the large pond-skater *Gerris costae* H-S. was taken among other places at 5,500 feet on a little tarn above Umhausen. This tarn, flooded with snow water which poured down from the melting drifts on the slopes above, had nevertheless a large population of water-beetles, *Notonecta* nymphs, dragonflies and newts. But the most unexpected of its inhabitants, or rather of its visitors, for the appearance of such an exotic looking insect in that bleak place must surely have been due to some accidental uprush of warm air from the valley, was a Reduviid, the handsome black and red *Harpactor annulatus* L., which was lethargically clinging to a blade of the half-submerged grass at the edge of the pool. For its identification and for other assistance I must thank Mr. W. E. China of the British Museum (Natural History).—MAUD D. BRINDLEY, 25 Madingley Road, Cambridge: *October 1st*, 1935.

*A Yorkshire locality for Ameletus inopinatus Etn.* (*Ephemeroptera*).—As long ago as June, 1931, I captured at Malham (Mid-West Yorks) the male of the rare mayfly *Ameletus inopinatus* Etn., this being, I believe, the first record for the county. Although this season my visit to Malham was too late for the adults, I was successful, while collecting in the R. Aire, in obtaining nymphs of this species.—JAMES M. BROWN, 176 Carter Knowle Road, Sheffield: *October 8th*, 1935.

## Review.

'INSECT WONDERS OF AUSTRALIA.' By KEITH C. MCKEOWN, Assistant Entomologist, Australian Museum, Sidney, N.S. Wales. 8vo, pp. 245, 16 plates. Angus and Robertson, Ltd., Sydney, 89 Castlereagh Street; London, 37 Great Russell Street, W.C.1. Price 6/- net.

This brightly written and well-illustrated little work treats of the biology of a number of outstanding and characteristic forms of the insect life of the Australian Continent in a semi-popular but attractive style. The chapters on the ants, their dwellings, guests, and enemies; carpenter-bees, sawflies, fig-insects, fireflies, stick and leaf insects; the early stages of the great Hepialid moths; insect migration, flight, scents, and courtship, to mention only a few of the subjects here dealt with, are enhanced by ample quotations from the works of early and recent writers on Australian insects, some of these being not easy of access. The chapter devoted to the Termites may be selected as specially noteworthy; one Australian species is the largest of the Order as yet known; another builds tower-like nests twenty feet and upwards in height; while a third species (*Hamitermes meridionalis* Froggatt), locally common in the extreme north, is the architect of the unique, flat tombstone-lke magnetic nests, with their flat sides facing due east and west. These wonderful structures, of which a good idea is given by an excellent photograph at p. 132, were in all probability first brought to notice in the pages of this Magazine in 1892 (Vol. XXVIII, p. 283). We would also allude to the so-called 'Mountain Grasshopper' (it is regrettable that so few scientific names of the insects are given throughout the book), of whose habits an interesting account is given on pp. 170-2, and the 'jacket' is adorned with a striking coloured figure of the female in a fighting attitude, which might well have been included in the volume as a plate. A chapter on the insects which form a not unimportant item in the food of the aborigines of Australia—some of these, as the 'honey-pot' ants of the central deserts, and the large wood-feeding larvae of certain moths and beetles, have been found ere now acceptable to more civilized palates—concludes this excellent little work, which we heartily commend to all who desire to learn something of the marvellous insect life of Australia.—J.J.W.

## Society.

Entomological Club.—Two meetings of the Entomological Club were held at Oxford on July 20th, Sir Edward B. Poulton, F.R.S., in the Chair, and July 21st, 1935, Dr. Harry Eltringham, F.R.S., in the Chair.

Members present in addition to the Chairman: Mr. Horace Donisthorpe, Mr. H. Willoughby Ellis, Mr. Jas. E. Collin, Mr. W. J. Kaye. Visitors present: Mr. H. E. Andrewes, Dr. Malcolm Burr, Prof. G. D. Hale Carpenter, Dr. B. M. Hobby, Dr. Karl Jordan, Mr. E. Bolton King, Sir Guy A. K. Marshall, Capt. N. D. Riley, Dr. Hugh Scott, Mr. W. H. T. Tams, Mr. Colbran J. Wainwright, Comm. Jas. J. Walker, Dr. C. A. Wiggins.

On Saturday afternoon, July 20th, the members and visitors were received by Sir Edward and Lady Poulton and Dr. Harry Eltringham, in the Hope Department, and tea and light refreshments were dispensed by Lady Poulton and friends, and the Hope collections were available for inspection. Accommodation was provided for members and visitors at Jesus College. In the evening dinner was served at Jesus College, Sir Edward B. Poulton, F.R.S., in the Chair, and a very entertaining evening was spent.

Sunday morning was left open for individual pursuits and some of the party took advantage of collecting in the district. After luncheon at Jesus College, the whole company assembled in the Hope Department grounds for an excursion in motor-cars to Bagley Wood, where the Staphylinid beetle recently introduced to the British lists, *Philonthus rectangulus* Sharp, was found in some numbers and a nice series was obtained. In the evening dinner was again served at Jesus College, Dr. Harry Eltringham, F.R.S., in the Chair, and another interesting and enjoyable evening was spent. At the conclusion of this pleasant and successful meeting the company dispersed on Monday morning.—H. Willoughby Ellis, *Hon. Sec.*

## MISCELLANEOUS OBSERVATIONS ON THE BIOLOGY OF *APANTELES GLOMERATUS* L. (BRACONIDAE).

BY ANDREW G. HAMILTON, B.Sc, B.Agr. (Q.U.B.), D.I.C.

### Introduction.

This paper is based on observations made during the years 1932-33 at the Imperial College of Science and Technology, Biological Field Station, Slough, Bucks.

### (a) Oviposition.

In nature *Apanteles* females oviposit throughout the greater part of the summer and autumn in young caterpillars of *Pieris*. Under normal temperature conditions egg-laying may begin almost immediately after emergence. When the female is about to sting, having apparently detected the presence of the caterpillar, she approaches it, at the same time feeling the leaf with the antennae and moving the ovipositor in and out. In the case of first stage caterpillars, the female on reaching the host stops, curves the ovipositor partly under the abdomen of the victim, and generally inserts it ventro-laterally into the 6th, 7th or 8th segment, approximately, of the abdomen. Following the withdrawal of the ovipositor from the host, the female *Apanteles* was observed to rub her abdomen on the cabbage leaf and to push the ovipositor in and out in the same way as before stinging. It is interesting to note that first stage caterpillars of *P. rapae* and *P. brassicae* do not attack until the *Apanteles* attempts to insert the ovipositor, and once it is inserted the attack generally ceased. I have never observed a first stage caterpillar of any age expel green saliva when attempting to drive off the *Apanteles*. On several occasions it was observed that first stage caterpillors offered no resistance to the female. Second and third stage caterpillars of *P. rapae* and *P. brassicae* attacked the approaching female and secreted green saliva, with the result that *P. rapae* often succeeded in driving off the female before she had time to deposit any eggs and *P. brassicae* prevented stinging altogether. Owing to this resistance on the part of second and third stage caterpillars of *P. rapae* it was found that the *Apanteles* inserted the ovipositor into any part of the host's body. The success of oviposition in these stages seemed to depend upon the keenness of the female. It was found impossible in my experiments to get the female to sting these advanced stages unless she had been kept for two to four days without oviposition material The following are my observations in a few typical cases of *P. rapae* during the autumn of 1932 :—

(1) Male and female *Apanteles* were kept in a glass tube for over two days. It was assumed that mating had in all probability taken place, so a second stage *P. rapae* caterpillar was introduced on a piece of cabbage leaf. In about ten minutes the female approached in the usual manner, attacked rather suddenly and inserted her ovipositor into the first or second segment of the thorax. The caterpillar exuded a green saliva from its mouth but did not wave its head about. This caterpillar died seven days later, and when dissected fourteen *Apanteles* larvae were found in the body cavity. (2) A third stage *P. rapae* caterpillar was placed on a piece of leaf in a tube with a pair of *Apanteles* which had been together since the time of emergence three days previously. In approximately one minute the female approached the caterpillar in the typical way and apparently succeeded in getting her ovipositor inserted into the posterior part of the victim's abdomen, when suddenly the caterpillar flung its head round, attacked the parasite and discharged green saliva from the mouth. This drove the para-

site off. The parasite and its host were left together for some time in the tube, but any attempt by the *Apanteles* to approach the caterpillar was prevented by the latter. This caterpillar was killed and dissected at the end of ten days, but no parasites were found. (3) For this experiment a third stage *P. rapae* caterpillar was also used. It was introduced into a tube containing a pair of *Apanteles,* over two days old, and was left for half an hour, but nothing occurred. It was now removed to another tube with a pair of *Apanteles,* three to four days old, and at the end of about three minutes the female attacked and stung on the side of the abdomen. The caterpillar did not exude any saliva, nor was the attack as vigorous as in some cases, which may be partly explained by the fact that the caterpillar moulted some time later on the same day. This caterpillar was killed seven days later and dissected, when 13 larvae were found in the body cavity.

During May, 1933, four experiments were carried out in order to ascertain which stage (first, second or third) and which species of *Pieris* (*rapae, brassicae* or *napi*) the *Apanteles* would sting if given a choice. Different pairs of *Apanteles* were used for each experiment, and the number of caterpillars used varied from 6 to 15 according to the number available on the day of experiment. The caterpillars were arranged on a young cabbage plant placed in a breeding cage with a pair of *Apanteles* and set out in the sun for over nine hours. It is unnecessary to go into these experiments more fully as only two were parasitised, one a first stage *P. rapae* and one a first stage *P. brassicae.* Whether the percentage is calculated from the total number of either species used or only from the number of first stages of the caterpillars, it is rather low and shows that some factor, possibly light, must have prevented oviposition. Although it is the general opinion that the female is guided by the olfactory organs in her search for the caterpillars, yet, as in the case of the male searching for the female, her olfacfactory sense is dulled by inactivity due to lack of sufficient light. That sterility of the *Apanteles* was not the reason for this low rate of parasitism is shown by the fact that the females used had all previously been observed stinging caterpillars in 3 in. by 1 in. glass tubes, and where these were in a suitable stage parasitism occurred.

I am in agreement with Picard (1922), who says that the first is the most usual stage to be stung either before or after it has started to feed on the cabbage leaves. I also agree with Faure (1926), as shown above, that it is possible for oviposition to occur in second and third stage *P. rapae* under laboratory conditions.

The fact that first stage caterpillars offer very little resistance to the *Apanteles* is a strong point in favour of the view that in nature the parasites always attack this stage. Another important point is that on first stage caterpillars there are only primary white setae, whereas in later stages secondary black setae have developed which are larger and probably more objectionable to the female *Apanteles*.

### (*b*) DURATION OF OVIPOSITION.

The time required to oviposit in first stage caterpillars was found to vary from 20 to 40 seconds. In the case of older stages of caterpillars the time was found to vary more. It sometimes happened that the female was driven away by the caterpillar before this time was reached, while on the other occasion the time exceeded 50 seconds.

### (*c*) NUMBER OF EGGS DEPOSITED AT EACH STING.

The number of eggs deposited at each successful sting is very variable, as shown below. Only caterpillars stung in the first stage are taken into account. These results were obtained either by dissecting the caterpillars or by keeping them until the *Apanteles* larvae emerged, and then counting the cocoons. In order to get the exact number of *Apanteles* larvae, the caterpillars were dissected as soon as they died; if they had not died before the end of the second day from the time the parasites emerged, they were killed and examined. If larvae were found in the caterpillars, the number was added to the number of cocoons.

The number of *P. rapae* dissected was not large enough to treat as a whole, so the result for each individual is given. One caterpillar was dissected two days after stinging, when six eggs of *Apanteles* were found, but as this number is very small and the possibility of missing some eggs when dissecting is very great, no importance can be attached to this result. Two caterpillars were kept for a longer time before dissecting, and 15 larvae were found in one and 25 in the other. In May, 1933, two caterpillars which had been kept until the parasites had emerged were calculated to have contained 25 and 27 larvae. In the case of *P. brassicae* experiments made during May and June of 1933, all caterpillars were kept until the parasites emerged. For 15 parasitised caterpillars the average number of larvae per sting was 30·5. In this species the variation was much greater, ranging from 2 to 54.

### (*d*) REPETITION OF OVIPOSITION.

How often a female can sting during her life was not ascertained, but a few experiments were carried out to see how often she would sting within a known time. Quite a number stung once but would not sting again during the succeeding hour, while others stung quite often. The following are two of the most striking examples:—(1) A first stage *P. brassicae* was introduced into a 3 in. by 1 in. glass tube containing a female *Apanteles*. As soon as oviposition had occurred once, the caterpillar was removed and another placed in the tube. This was repeated until the *Apanteles* had stung ten first stage *P. brassicae* and refused to sting any more. The time taken to sting this number was 50 minutes. The first eight stings were successful; the last two were not, as the caterpillars pupated and gave rise to normal butterflies. The largest number of eggs was laid at the first sting, and the smallest at the second, and not as might have been expected at the last successful sting. The total number of eggs was 197 for the eight successful stings, thus giving an average of 24·6 per sting. The female in this experiment had been in a tube with a male previous to the commencement, but during the time between the first and last sting she was not allowed to copulate. Notwithstanding this fact, females were produced from eggs laid at the last sting as well as the first, which shows that it is not necessary for the female to copulate between each oviposition. If it were, then parthenogenetic males would have been produced from all stings except the first. (2) This experiment was slightly different from the preceding. Four first stage caterpillars were stung three times each by one *Apanteles*. The total number of eggs for the twelve stings was 163, or an average of 13·6 per sting. This is lower than in the previous experiment and suggests that some stings were unsuccessful, but as each host was stung three times it was impossible to know which were unfruitful. Here again copulation did not take place between the first and last sting and both male and female *Apanteles* emerged from all caterpillars. That the last number of stings were not the unfruitful ones is shown by the fact that the last caterpillar contained more parasites than one of those stung earlier.

### (*e*) LARVAL LIFE.

The young *Apanteles* larvae move about in the body fluid of their host upon which they at first feed (Grandori, 1911). It is not until later that they feed upon the fat body. They become fully developed and emerge just before the caterpillar is due to pupate, that is, when the caterpillar has stopped feeding and has spun a mat of fine fibres. Each larva penetrates the skin of the host by eating or gnawing a separate opening through which it emerges. It was found that the length of endoparasitic life varied from 18 to 23 days with an average of 20 days. These are based on observations made on 21 caterpillars parasitised during the first instar and kept in glass-tôpped tins in the laboratory. A very interesting fact is that there did not appear to be any difference depending on the number of larvae present.

The spinning of the cocoon is never delayed as the larvae starts immediately after or during emergence. In several cases the larva *Apanteles* died, having failed to spin a cocoon.

An examination of parasitised caterpillars after the larvae had ceased emerging revealed that in 50 per cent. of the caterpillars all the parasites did not emerge. The number of parasites remaining varied from one to five. Taking the total number of larvae, it was found that 2·8 per cent. never escaped. Although the larvae did not emerge they had in all cases reached the final instar, with spiracles and spines, but for some unknown reason failed to emerge. In one case the caterpillar was killed and it was found that the remaining parasites had been dead some time and had started to decay. One had died half emerged. The number of larvae in the host does not appear to have any relation to the number which fails to escape, nor does there seem to be any marked difference in relation to the species of *Pieris* involved. This is shown very clearly by the following examples: (1) A caterpillar containing 20 parasites, five did not emerge; (2) a caterpillar containing 54 parasites, only one failed to escape. Also it is quite common to find over 40 parasites in one host and all emerge.

## RECOGNITION OF LARVAL STAGES OF A. GLOMERATUS.

Owing to most of the larval life of *A. glomeratus* being endoparasitic in the body of the caterpillar, it was impossible to follow the different stages in the same specimen. In all 7,891 larvae, found in stages one to five of *P. brassicae* and *P. rapae*, were examined and classified. All larvae were measured to the nearest ·5 of a mm. in order to show the range in size for each instar. It was found possible to recognise at least three instars.

By external examination and measurement, the instars can be recognised as follows :—

### (*a*) FIRST INSTAR (Fig. 1).

(1) Head as broad as it is long, or nearly so, and markedly separated from the body.

(2) No indication of the imaginal buds of the eyes, wings or legs can be seen.

(3) There are nine abdominal segments, with the ninth inserted into the eighth by what Gatenby (1918) calls a 'bottle-stopper' joint. This is followed by a ring-like segment which in turn is followed by the caudal vesicle. If this ring-like segment is traced through all the stages it can be seen that it becomes more like a normal segment, but it never develops spines.

(4) Caudal vesicle about the same width as the body.

(5) Silk glands poorly developed.

(6) A very small pair of mandibles are visible.

(7) Size is from embryo up to between 2 and 2.5 mm. long.

(8) This stage is found chiefly in the second and third stage caterpillars. It becomes rarer in the fourth stage and was only found in the fifth in very exceptional cases, as for example in a caterpillar which contained 128 parasites. In this particular example the majority of the *Apanteles* larvae were in the second instar, but a few first were also found.

Some interesting observations were made on this stage in the following way. A caterpillar was killed approximately two weeks after it had been stung, thus giving the parasitic larvae time to develop. It was placed immediately in a 'physiological' salt solution and dissected. The *Apanteles* larvae were still alive, and it was found that they were able to live in this solution for many hours, which afforded an excellent opportunity to observe their movements. During this stage the larvae are comparatively transparent owing to the silk glands not having developed to any great extent, with the result that the other organs can be seen to advantage. The caudal vesicle and dorsal vessel pulsate with rhythmical contractions from the posterior end forward. Also the alimentary canal waves and contracts, and when it does so, the point of attachment to the vesicle is drawn inwards. If viewed dorsally under the low power of the microscope it is possible to see eight valves along the dorsal vessel, which open and close as the wave-like contraction passes forward. These valves are situated, the first between segments 2 and 3 of the thorax, and the last between segments 7 and 8 of the abdomen. In front of these functioning valves there are three constrictions on the walls of the dorsal vessel. The first is situated in the region of the brain, the second between the head and thorax, and the third between the first and second thoracic segment.

### (*b*) SECOND INSTAR. (Figs. 2 and 3.)

(1) Head broader in proportion to its length than in first instar, and not so distinctly separated from the thorax.

(2) The imaginal buds of the eyes, wings and legs are very distinctly marked. (Especially if larva is stained with Carbol Fuchsin.)

(3) There are now nine distinct abdominal segments followed by the ring-like structure and after this the caudal vesicle.

(4) The caudal vesicle is larger in this stage in proportion to size of body than during any other instar.

(5) Silk glands gradually develop until the larva becomes quite opaque.

(6) The mandibles are small at first, but develop throughout growth until, towards the end of this stage, they become brown and show up very distinctly.

(7) Size from over 2 mm. to between 5 and 6 mm.

This instar is never found in caterpillars younger than the third stage, and even in this stage only a few specimens were found. The greatest number is in the fourth and fifth stage.

### (*c*) THIRD INSTAR.

This is very characteristic and may be classified according to whether it is in (i) the endoparasitic period or (ii) the non-parasitic period.

(i) Endoparasitic period, still within the old skin of previous stage (Fig. 4).

(1) Head continuous with rest of the body.

(2) The imaginal buds of eyes, wings and legs present. These show up much better if the larva is cut open along the dorsal surface, the sides folded back and the internal organs removed.

(3) There are nine distinct abdominal segments; the ring-like structure found in the younger instars is much more like a small segment, making ten abdominal segments.

(4) The caudal vesicle is small owing to contraction in preparation for emergence.

(5) Silk glands are greatly developed and coiled so that they fill the greater part of the body.

(6) Mandibles well developed and are used for cutting the hole in the host through which this stage larva emerges.

(7) Eight pairs of spiracles have now developed: the first pair on the anterior margin of the meso-thorax, the remaining seven pairs on segments 1 to 7 of the abdomen.

(8) Black spines are found on all body segments except the tenth. There are no spines on the head. Also the entire surface, with the exception of the caudal vesicle, is covered with minute rugosities.

(ii) Non-parasitic period (Fig. 5). Similar to the endoparasitic period except for the following changes which have taken place:—

(1) In the process of emergence the cast skin of the second instar is deposited inside the hole in the host's body through which the parasitic larva escaped.

(2) The caudal vesicle is completely contracted into the body.

(3) Lives in a cocoon spun by itself. In this cocoon pupation takes place and the adult emerges by cutting a round cap off one end.

Although only three instars have been described, it is quite possible that the instar described as the second may represent two. This is suggested by the fact that the increase in size during this instar is greater than would be expected without the occurrence of a moult. Also specimens approximately 3·5 mm. long were found which appeared to be ready to moult, and as no spiracles were observed and the vesicle was still very large, they were not moulting to become the last larval instar. As it was impossible definitely to separate larvae smaller than 3·5 mm. from those larger, all were included in what has been called the second instar.

### (*a*) NUMBER OF SEGMENTS IN LARVA.

Seurat (1899), working on *A. glomeratus,* states that the larva shows the following segmentation: — Head, three thoracic and nine abdominal segments and a caudal vesicle. Gatenby (1918), working on *Microgaster connexus* and *A. glomeratus,* also believes that the larva is made up of this number of segments. In my observations it was possible, by comparing the different instars, to recognise: — Head, three thoracic and ten abdominal segments, followed by the caudal vesicle (except in the non-parasitic period of the third instar). The head appears externally to be constructed of two segments. In young specimens it is possible to see, through the cuticle, the nervous ganglia which form the brain. The thoracic and the first nine abdominal segments are easily recognised. All these segments are covered with rugosities and bear spines in the third instar. What I propose to call the tenth abdominal segment, Gatenby (1918) apparently called part of the caudal vesicle, as he calls the vesicle the 'tenth' segment. As the larva grows this segment becomes more distinct, until in the free-living period of the third instar it appears as a definite segment. Like the other segments in this instar, it is covered with rugosities but, unlike them, has no spines.

(*To be continued.*)

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## TWO SPECIES OF COLEOPTERA NEW TO BRITAIN.

BY HORACE DONISTHORPE, F.Z.S., F.R.E.S., ETC.
(Entomological Department, British Museum, Natural History.)

1. *Ocalea puncticollis* Muls. & Rey, Hist. Nat. Col. France, Brév. Aléoch., II, 1874, 468.

Head black, thorax blackish-brown, elytra brown, hind body darker brown with apex of segments lighter, antennae, palpi and legs yellow, antennae somewhat darker towards apex. ***Head*** round, with alutaceous puncturation and fairly close larger shallow punctures, very sparsely pubescent; ***antennae*** gradually thickened towards apex, with joints 1, 2 and 3 elongate, 1 and 2 subequal, 3 longer, 4 much shorter but longer than broad, 5, 6 and 7 getting shorter in proportion to their breadth, 8, 9 and 10 subtransverse, last joint longer than broad. ***Thorax*** about as long as broad, very sparsely pubescent, with alutaceous puncturation with more numerous larger punctures than head, a fine central line extends from near apex to the distinct transverse fovea near base. ***Elytra*** at suture about as long as thorax, longer at sides, more pubescent with numerous punctures which look rasp-like when seen in a slanting position.

**Hind body almost smooth with scattered seta-bearing punctures on segments. L. 4.8 mm.**

This species comes nearest to *Ocalea badia* Er., from which it differs in colour, and in that the antennae are slightly thicker and shorter, the penultimate joint of the maxillary palpi is slightly thicker at the apex, the head is slightly broader and rounder, and the thorax is less rounded in form and behind, and the sides are straighter. The fine central line is much more distinct, and the basal fovea larger and deeper. The insect is also less pubescent. Also the puncturation is different; in *badia* the head and thorax are much smoother (especially the head) between the punctures.

Taken by sifting moss in Windsor Forest on October 23rd, 1935. The Windsor insect agrees exactly with some specimens in the general collection at the British Museum, from Beikos, determined by Dr. Cameron as *O. puncticollis* Muls. & Rey. It is recorded from France, Corsica and Italy.

In some works it is treated as a variety of *O. badia,* but it appears to be quite a good species.

2. *Sitones decipiens* Lindberg, Mem. Soc. F. Fl. Fenn., **9**, 111 (1933).

' Von *S. lineellus* Bonsd. durch folgende Merkmale unterschieden : Die Punkten auf dem Halsschild sind rund, die Schuppen zahlreicher, die Borstchen auf den Flugeldecken sind viel langer und die Schuppen sind nicht metallisch. Von *S. crinitus* Hbst. durch kurzere und dichter stehende Borstchen, kurzeren Korper, breiteren Halsschild und in der Regel weniger deutlich hervortretende schwarze Flecken.'

On June 7th, 1905, I swept off *Lathyrus pratensis* at Portmarnock, Co. Dublin, a number of specimens of a *Sitones* which I made out to be *S. lineellus*. Subsequently on April 27th, 1912, I found a *Sitones* in some numbers on the Isle of Tiree. They were crawling about, and at the roots of *Lotus corniculatus* and other plants, on the sandhills. Though they were named *S. lineellus* by one or two of the British Coleopterists of that day, I was not satisfied, as I saw they were different to my Irish species, and they have stood in my collection ever since under a label *lineellus* var.

When Mr. Lindberg was at the British Museum this year, he separated two species of *Sitones* in the British Collection — three specimens from Birch Wood he named *S. lineellus* Bonsd., and some eight specimens he determined as his *S. decipiens* (the scales on the elytra are slightly metallic). These came from 'Galway, Kirkaldy,' and one labelled T. Bold. T. J. Bold records *S. lineellus* from 'Sea Banks N. of Whitley and Hetton Hall nr. Belford' [Nat. Hist. Trans. North. and Durham, **4**, 88 (1871)].

My Irish specimens agree exactly with the Birch Wood species, and those from Tiree with *S. decipiens* Lindb. I am thus able to add this species to the British list.

Mr. Lindberg described his *S. decipiens* from 'hochnordischen Biotopen' on *Astragalus*. In a subsequent paper he records it from a number of localities in Finland (Notulae Ent., 1933).

British Museum (Natural History),
Cromwell Road, London, S.W.7.
*November 8th*, 1935.

## A NEW GENUS AND SPECIES OF PASSALIDAE (COL.) FROM AUSTRALIA.

BY W. D. HINCKS, M.P.S., F.R.E.S., AND J. R. DIBB, F.R.E.S.

For some years we have had in our joint collection two examples of a striking Macrolinine which we were unable to place generically. They were received with the nucleus of our collection from Mr. E. C. Horrell, of Bradford, and, we believe, had formed part of the Schill collection,* a few boxes of duplicates from which were acquired by Mr. Horrell. The labels bore the legend '*Taeniocerus deyrollei* Kaup, Australie,' and as it was evident that the specimens were not the Aulacocycline *T. deyrollei* we were led to doubt the authenticity of the locality also.

It was with pleasure, therefore, that one of us discovered another example of what appeared to be the same species in the British Museum collection whilst on a visit there some time ago. This bears a Queensland locality, and recently, when Mr. Arrow was sending some material for identification, he was good enough to include the specimen, which proves to be identical with our own. The topographical data being thus confirmed, there is no reason for further delay in characterising the species, which is described in the present note as *Notocetius cornutus*, the British Museum example being selected as the type.

We are grateful to Mr. Arrow for the opportunity of describing this interesting form and to Mr. Horrell for the two original examples.

### **Notocetius** gen. nov. (Macrolininae).

Antennae with six short lamellae. Mandibles with three terminal teeth, the lower out of plane with the two upper; anterior lower tooth of the left mandible broader than that of the right and somewhat falcate; upper tooth present, behind which upper edge of mandible is straight. Head symmetrical; central tubercle large, pedunculate, with the horizontally directed free apex distally bifid; distal margin of head produced into a median tubercle; frontal area bounded by almost obsolete ridges; inner tubercles absent; outer tubercles prominent, strongly compressed, normally situated.

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* The Schill Coleoptera were auctioned by Stevens in 1909 *vide* W. Horn, Suppl Ent **12**, 1926 p 109; **17**, 1929, p. 111.

Pronotum with a distinct median sulcus. Elytra with dull lateral striae, medially bearing the rather small punctures; interstices shining, distinctly alutaceous laterally.

Mentum with large primary scars; secondary scars ill defined. Mesosternum without scars. Metasternum with narrow, distinct lateral areas which are covered with piligerous punctures; anterior circum-coxal areas similarly clothed.

Genotype: *Notocetius cornutus* sp. nov.

In most respects *Notocetius* agrees with the *Mastochilus* group of genera (*Mastochilus, Pharochilus, Cetejus* and *Analaches*) and, were these to be considered as subgenera, as by Gravely in 1918, then the present genus would perhaps be better placed as a subgenus also. We believe, however, these four genera to be distinct.

There are several striking differences between the present genus and the rest of the *Mastochilus* complex. The characters of the head are particularly important, and together with the unusual sculpture of the elytra (a feature which should not be insisted upon as generic) are the best means of separating the genus.

The central tubercle is widely free and has a pedunculate base; its free apex is horizontal and rather flattened with the extremity distinctly notched. The anterior margin of the head is unusual in this subfamily, in having a distinct median tubercle. The frontal area is large, matt and rugose with only indistinct bounding ridges from which the inner tubercles are absent. The whole head is quite symmetrical.

### **Notocetius cornutus** sp. nov.

Antennal lamellae short; basal three very short. Labrum with distal margin concave. Head with large shield-shaped frontal area, dull and rugose, with anterior margin produced and tuberculate; central tubercle widely free, pedunculate, with upper surface of horizontal free portion rather flat with a distinct median depression and the apex bifid; parietal ridges placed at right-angles to central tubercle, their upper edges rather sharp; general surface of head, except frontal area, shining; posterior to the eyes a strong patch of piligerous punctures present.

Pronotum transverse, moderately convex with distinct median sulcus interrupted in front; scars punctate, otherwise general surface impunctate; lateral grooves discontinuous behind, very broad cephalad; marginal grooves widely separated, broad and, like the lateral grooves, granulate.

Elytral puncturation distinct throughout, a little stronger laterally but not transverse; lateral striae appearing as matt bands bearing small punctures medially; interstices laterally distinctly alutaceous; apex of elytra dull.

Mentum with matt and strongly punctured side pieces; medially nitid with a few punctures. Mesosternum finely rugose almost throughout, punctured medially cephalad. Lateral areas of metasternum narrow, with piligerous punctures; anterior intermediate areas with hair-bearing punctures; disc impunctate; posterior intermediate areas bearing numerous non-piligerous punctures.

Abdominal sterna with large, punctate, rather dull scars; last sternite almost covered with punctures, less closely medially, apically bearing an impressed marginal groove.

Hair tufts absent from shoulders, weak on lower surface of prothorax and legs.

Length 29—31 mm.

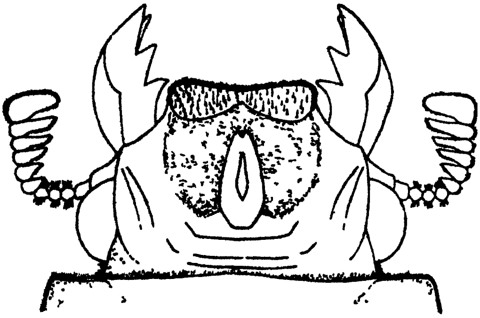

Fig. 1.—Dorsal aspect of head of *Notocetius cornutus* sp.nov.

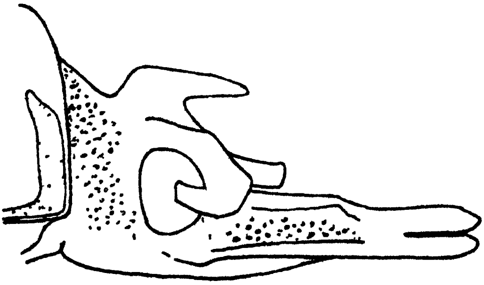

Fig. 2.—Lateral aspect of head of *Notocetius cornutus* sp.nov.

Type (in British Museum): North Queensland, Malanda (G. F. Hill). (Presented by the Imperial Bureau of Entomology.)

Paratypes (in coll. Hincks & Dibb): Australia (2 examples) (ex coll. E. C. Horrell).

Leeds.
*October*, 1935.

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## A NOTE ON THE GENUS *LITHINUS* Burr. (DERMAPTERA).

### BY W. D. HINCKS, M.P.S., F.R.E.S.

In 1909[1] Dr. Malcolm Burr proposed the name *Lithinus* for the reception of *Forficula analis* Rambur on the following grounds:—

'*Pseudochelidura analis* differs from the other species in having a keel on the elytra; this is a very distinctive feature, shared in this family by *Allodahlia*, but *P. analis* differs from that genus in the short, quadrate elytra, which are obliquely truncate at the posterior margin. On the strength of these characters, I propose the new generic name *Lithinus* ; no other known species is included.'

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[1] Deutsch. Ent. Zeitschr. 1909, p. 327.

Were the above the only difference between *Lithinus* and *Allodahlia* we should regard the two as synonymous, as we refuse to give generic status to differences of size in the wings and elytra, but in reality the two genera are quite distinct despite the similarity of the elytral keel.

Subsequently[2] Dr. Burr 'describes' the genus in the following terms :—

'Elytra short and truncate, with sharp keel running their entire length; wings abortive; forceps [of male] strongly arcuate and undulate.'

We are deeply indebted to Dr. Burr for a fine pair of Rambur's rare species from the Sierra Nevada, which enable us to add materially to Burr's short notes quoted above and also to figure the male genitalia, which appear to have been previously unexamined.

The generic name *Lithinus* is of course preoccupied by that of Klug, proposed in 1833 for a well-known genus of Curculionid Coleoptera, so that the present genus requires renaming. This matter has been referred to Dr. Burr, and at his request we are making the necessary alteration in the present note.

### **Eulithinus** nom. nov.

*Lithinus* Burr (praeocc. Klug, 1833, Col.), Deutsch. Ent. Zeitschr. **1909**, p. 327. (Typus: *Forficula analis* Rambur, 1838.); Genera Insectorum, Fasc. 122, 1911, p. 70, 72.

♂ ♀. Antennae 12-jointed (? ♂ 11-jointed); segment 1 nearly as long as 2 and 3 together, broad; 2 small; 3 about as long as 5, but narrower; 4 narrower and shorter than 5, which is shorter and slightly broader than succeeding segments. Eyes small. Sutures of head distinct but not deeply impressed. Head rather tumid behind eyes; caudal margin lightly concave.

Thorax transverse, a little narrower cephalad than caudad, subtruncate cephalad, gently curved caudad with subparallel sides.

Small scutellum present. Elytra very short, shorter than thorax at suture, obliquely truncate with strong lateral keels throughout whole length. Wings abortive.

Legs rather short and stout. Tarsal segments 1 and 3 subequal, 1 considerably stouter than 3, 2 distinctly dilated.

♂. Anal segment with large latero-distal tubercles above base of forceps. Forceps arcuate, undulate and distant, unidentate on both upper and lower surface, proximad. Pygidium broad, subtriangular in shape. Genitalia typically Forficuline, with rather narrow metaparameres, subparallel, apically rounded.

---

[2] Genera Insectorum, Fasc. 122, 1911, p 72.

Vesicle of virga with a chitinous appendage; virga with narrow chitin plate. Proparameres with distinct striated chitinous areas.

♀. Forceps short, broad, trigonal in section, more or less scissor-shaped with incurved apices. Pygidium prominent, subquadrate in outline, a little broader proximad, truncate distad with minutely tuberculate angles, proximally strongly convex above.

Besides the reduced elytra and wings (characters of no generic value) *Eulithinus* differs from *Allodahlia*[3] (the only allied genus with complete elytral keels) in a number of features such as the length of the legs, shape of thorax, abdomen and pygidium, and the general sculpture of the body. The present genus appears to be closely allied to *Perirrhytus* Burr, 1911,[4] known to us only from description. *Perirrhytus* differs in having simply arcuate forceps in the male, only short keels on the similarly abbreviated elytra, quadrate male pygidium, and less transverse thorax.

These differences taken alone are not very convincing, but it is thought that the Madeiran genus will prove to be distinct when specimens are available for study. From the other genera, listed by Burr in his revision in Wytsman's Genera Insectorum under the subfamilies *Chelidurinae* and *Anechurinae, Eulithinus* appears to be tolerably distinct and can be readily separated by the complete elytral keels.

### *Eulithinus analis* (Ramb. 1838).

*Forficula analis* Rambur, Faune Ent. Andalousie, 1838, 2, p. 10.—Fischer, Orthopt. Europ. 1853, p. 79.

*Chelidura analis* Dubrony (Bormans), Ann. Mus. Genova, 1878, **12**, p. 434, f.—Bormans, Das Tierreich, 11 Lief., 1900, p. 105, 106.

*Lithinus analis* Burr, Deutsch. Ent. Zeitschr. **1909**, p. 327; Genera Insectorum, Fasc. 122, 1911, p. 72, pl. 6, f. 14.

Apparently confined to the Sierra Nevada.

The male genitalia (fig. 1) are essentially Forficuline in character. The metaparameres are long and narrow and more or less parallel-sided with the apices rounded. The virga is simple with a well-marked vesicle which appears to have a chitinous appendage attached near its junction with the virga. A distinct, narrow chitin plate lies alongside the virga and the surrounding areas of the proparameres have what appear to be large, thin plates of striated chitin.

The male pygidium (Fig. 2) is subtriangular with the two apical sides broadly thickened. The basal angles are very prominent and somewhat uneven. In the female the pygidium (Fig. 3) is subquadrate, rather broader proximad, the upper surface being strongly convex in the basal two-thirds ; the apical plate-like portion is truncate distad with the outer angles minutely unituberculate.

---

[3] *Allodahlia* Verhoeff, Zool. Anz **1902**, p. 194 (Typus; *Forficula scabriuscula* Serville, 1839)

[4] Genera Insectorum, Fasc. 122, 1911, p 71, 72 (Typus: *Forficula edentula* Wollaston, 1858, Madeira).

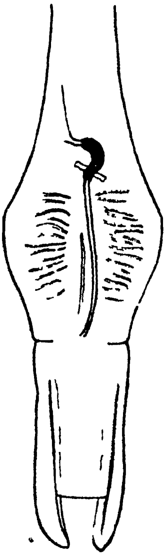

FIG. 1 —♂ genitalia of *Eulithinus analis.*

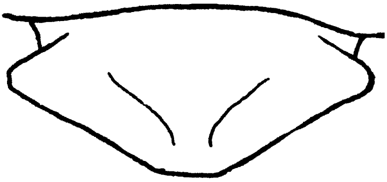

FIG. 2.—♂ pygidium of *Eulithinus analis*

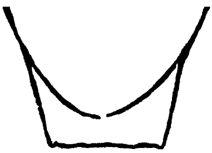

FIG. 3.—♀ pygidium of *Eulithinus analis.*

The specimens examined are 1 ♂, length 14 mm. (incl. fcps.), 1 ♀, shrunken, length 10 mm. (incl. fcps.) from Sierra Nevada: Laguna de la Yaguas, ca. 2,500 m. (?), under stones, damp places, 14.ix.35 (Carpentier).

46 Gipton Wood Avenue,
Harehills, Leeds.
*October,* 1935.

## A NORTH AMERICAN JASSID (HOMOPTERA) IN SURREY.

BY W. E. CHINA, M.A.

(Dept. of Entomology, British Museum (Natural History).)

Towards the end of the 1933 season Mr. Lewis Baron, while collecting Coleoptera, noticed a number of specimens of a very striking Homopterous insects on *Rhododendron* at Chobham in Surrey. Believing it to be an ordinary British species which was unknown to him, he only took one specimen. This was recently brought to me for identification by Mr. H. St. J. K. Donisthorpe. It proved to be a specimen of the North American *Graphocephala coccinea* Forster. This species belongs to the super-family Jassoidea, family Cicadellidae, and is allied to our *Cicadella viridis* L. (*Tettigonia viridis* Edw.). The following short description will enable British collectors to recognise it.

*Graphocephala coccinea* Forster.

1771. *Cicada coccinea* Forster, Nov. Spec. Ins., p. 69.
1835. *Tettigonia coccinea* Harris in Hitchcock, Geol. Bot. and Zool. Massachusetts, Ed. 2, p. 580.
1876. *Diedrocephala coccinea* Uhl., Bull. U.S. Geol. Geogr. Survey 1, p. 357.
1916. *Graphocephala coccinea* Van Duzee, Check List Hemipt. America North of Mexico, p. 66.

Head bright yellow, the eyes and a broad band round the anterior margin between vertex and frons black. Pronotum bright bluish-green with the anterior margin broadly yellow and two orange-yellow spots on green area. Scutellum deep yellow. Tegmina bright bluish-green with the costal margin yellow, a broad scarlet stripe down middle of clavus and another scarlet stripe down inner half of corium widening to apical margin, appendix smoky, extreme apical margin of tegmen fuscous. Hind wings black. Legs yellow. Sternum and pleura yellow. Abdomen scarlet above, yellow below, ovipositor black. There is a certain amount of variation in the colour pattern. Sometimes the orange spots on the pronotum are much larger and the scarlet stripe on the corium varies in the width and length. The head is much more prominent than in *Cicadella viridis* L., being parabolic in shape. Length including tegmina about 9 mm.

*Graphocephala coccinea* occurs throughout the eastern half of the United States and extends into the Canadian Provinces of Quebec and Ontario. It should therefore readily become acclimatised in this country. Gibson (Canad. Ent. 48, p. 178, 1916) records it in the Central Mississippi Valley States as feeding on a great variety of plants, including over fifty species of weeds, grasses, many ornamental plants and shrubs, and various trees, including American Holly and Magnolia. The adults remain almost inactive during the day-time but are attracted to lights at night. There are two generations in the year, the first during June and July, the second in September and October. The winter is passed in the egg-stage.

From these facts it seems likely that this beautiful species will spread rapidly over Great Britain, and the rate and direction of its dispersal will make an interesting study. Its striking appearance should render its discovery and identification a simple matter. British collectors should therefore keep a sharp look-out for it, so that data relative to its dispersal may be recorded.

British Museum (Natural History),
Cromwell Road, London, S.W.7.
*November 17th, 1935.*

*Records of various Diptera captured between* 1929 *and* 1935.—The following records of some of the less common species of Diptera may be of some interest to collectors. These records are of specimens in my collection, which I have taken myself or had presented between 1929 and 1935.

SYRPHIDAE.—*Chilosia grossa* Fln., Middlesex, Harefield, 31st Mar., 1935, 1 female. *Didea fasciata* Mcq., New Forest, Brockenhurst, 20th Aug., 1932, 1 female. *Xanthogramma citrofasciatum* Deg., Kent, Eynsford, 2nd June, 1933, 1 male and 1 female. *Ischyrosyrphus laternarius* Müll., Surrey, Byfleet, 17th July, 1932, 1 female; Sussex, Trotton, 14th Aug., 1932, 1 female. *Volucella inanis* L., Surrey, Ashtead, 30th July, 1932, 1 male; Isle of Wight, Springvale, 11th Aug., 1935, 1 female; Sussex, Coldwaltham, 25th Aug., 1935, 1 female. *V. inflata* Fab., Surrey, Horsley, June, 1929, 1 male; New Forest, Brockenhurst 25—30th June, 1933, 3 males and 3 females. *Eristalis horticola* Deg., New Forest, Brockenhurst, 27th Aug., 1932, 1 female; Sussex, Coldwaltham, 17th Aug., 1935, 3 males and 3 females. *Helophilus trivittatus* Fab., Surrey, New Malden, 22nd Aug., 1931, 4 males; Middlesex, Boston Manor, 21st June, 1932, 1 male; New Forest, Brockenhurst, 20th Aug., 1932, 1 female. *H. frutetorum* Fab., Middlesex, Boston Manor, 30th June, 1935, 1 female. *H. versicolor* F., Middlesex, Boston Manor, 19th—21st May, 1933, 7 males and 3 females; Bucks, Langley, 4th June, 1934, 1 male. *H. lineatus* Fab., Middlesex, Boston Manor, 18th—24th May, 1933, 11 males and 9 females; 1934, 4 males and 3 females; 1935, 10 males and 8 females. *H. lunulatus* Meig., Middlesex, Boston Manor, 19th—30th May, 1933, 1 male and 5 females. *H. transfugus* L., Middlesex, Boston Manor, 16th May, 1932, 1 female; 24th May, 1933, 3 males and 2 females; 24th May, 1935, 1 female. *Merodon equestris* F. var. *transversalis*, Surrey, East Sheen, Palewell Common, June, 1931, 1 female; var. *validus*, Yorkshire, Kirkstall Abbey, June, 1932, 1 female. *Tropidia scita* Harr., Kent, Woolwich, 28th June, 1931, 1 female. *Criorrhina ranunculi* Pz., Bucks, Iver, 29th Mar., 1935, 1 male. *C. berberina* F., Surrey, Selsden, 26th May, 1935, 9 males. *C. oxyacanthae* Meig., Surrey, Brockham Green, 12th June, 1932, 1 female; Kent, Eynsford, 3rd June, 1933, 1 female; New Forest, 30th June, 1933, 1 female; Surrey, Selsden, 26th May, 1935, 3 males. *C. floccosa* Mg., Surrey, East Sheen, Palewell Common, 29th May, 1930, 1 male; Surrey, Claygate, 11th June, 1932, 1 male. *C. asilica* Fln., Sussex, Hollington, 15th June, 1935, 1 female. *Brachypalpus bimaculatus* Mcq., New Forest, Brockenhurst, 26th June, 1933, 1 female. *Chrysochlamys cuprea* Scop., Surrey, Selsden, 19th May, 1929, 1 female; New Forest, Brockenhurst, 30th June, 1933, 1 female; Sussex, Hollongton, 15th June, 1935, 1 male. *Sericomyia borealis* Fln., Yorkshire, Ben Rhydding, 6th Aug., 1931, 2 males; Yorkshire, Ilkley, 27th July, 1931, 4 males and 4 females; New Forest, Brockenhurst, 27th Aug., 1932, 6 males and 5 females; Scotland, Argylshire, Appin, 17th June, 1935, 1 male. *S. lappona* L., Scotland, Argylshire, Appin, 4th June, 1935, 1 male and 1 female. *Chrysotoxum cautum* Harr. (*sylvarum* Meig.), Surrey, Claygate, 11th

June, 1932, 3 males; 11th June, 1934, 1 male and 1 female; Surrey, Byfleet, 17th July, 1932, 1 female; Surrey, Ashtead, 28th May, 1933, 2 males and 3 females; Kent, Eynsford, 2nd June, 1933, 1 female; Sussex, Hollington, 11th May, 1935, 1 male. *C. octomaculatum* Curt., Surrey, Byfleet, 17th July, 1932, 1 female; Kent, Eynsford, 24th July, 1932, 1 female; Surrey, Ashtead, 30th July, 1932, 3 males and 1 female; Bucks, Iver, 1st August, 1932, 1 female; Surrey, Ashtead, 6th Aug., 1932, 2 females. *C. elegans* Lw., New Forest, Brockenhurst, 27th Aug., 1932, 1 female.

STRATIOMYIDAE.—*Pachygaster leachii* Curt., Middlesex, Gunnersbury Park, 18th July, 1932, 1 male; Middlesex, Boston Manor, 20th July, 1932, 1 male. *Oxycera formosa* Mg., Kent, Hythe, 29th June, 1931, 1 male. *Stratiomys potamida* Mg., Middlesex, Boston Manor, 16th July, 1922, 1 female. *S. furcata* Fab., Ireland, Co. Sligo, Bunduff, 23rd July, 1933, 4 males and 2 females. *Sargus iridatus* Scop., Sussex, East Hoathly, 19th June, 1932, 1 male; New Forest, Brockenhurst, 30th June, 1933, 1 female. *S. flavipes* Mg., New Forest, Brockenhurst, 27th Aug., 1932, 1 female.

CONOPIDAE.—*Conops ceriiformis* Mg., New Forest, Brockenhurst, 27th Aug., 1932, 1 male and 1 female. *C. flavipes* L., New Forest, Brockenhurst, 27th Aug., 1932, 2 males and 1 female. *Physocephala rufipes* F., Isle of Wight, nr. Pondwell, 11th Aug., 1935, 1 male.

ASILIDAE.—*Epitriptus cingulatus* F., Sussex, Hardham, 22nd Aug., 1935, 6 males. *Leptogaster cylindrica* Deg., Surrey, New Malden, 8th July, 1932, 1 male and 1 female.

TABANIDAE.—*Tabanus fulvus* Mg., New Forest, Brockenhurst, 29th June, 1933, 2 males.

TACHINIDAE.—*Chaetolyga amoena* Mg., Surrey, Claygate, 30th June, 1935, 1 male.—ALLEN M. LOW, 6 Manor Gardens, London, W.3: *October 27th, 1935.*

## Society

ENTOMOLOGICAL CLUB.—A meeting of the Entomological Club was held at Friary Hill, Weybridge, on Saturday, September 28th, 1935, Mr. H. Willoughby Ellis in the Chair.

Owing to the Entomological Congress at Madrid, a considerable number of invited guests who were attending the conference were unable to be present. The attendance was as follows: Mr. H. Willoughby Ellis (Chairman), Mr. W. J. Kaye (Member), Mr. R. W. Lloyd (Member), Mr. H. E. Andrewes, Major E. E. Austen, Dr. K. G. Blair, Mr. E. C. Bedwell, Mr. F. W. Frohawk, Mr. E. E. Green, Dr. S. A. Neave, Mr. W. Rait Smith, Mr. H. J. Turner.

The guests were received by Mr. and Mrs. Willoughby Ellis during the morning, and luncheon was arranged for 1 o'clock, after which, in sunny weather, the company divided between the gardens and museums. The Chairman's collections of Lepidoptera, Coleoptera and Hemiptera were on view and a very complete and varied collection of British Sphingidae attracted special attention, as also that of the Hemiptera. In so short a time only a small section of the Coleoptera could be seen.

On reassembling, tea was served in the Lounge at 4.30 and the company dispersed soon after 6 o'clock, after a very pleasant day.—W. J. KAYE.

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# ERRATA.

Page 10, line 2, *for* ‘ (Gaurorytes) ’ *read* ‘ (Gaurodytes).’
,, 11, in figure, insert ‘ 1 ’ beneath first figure.
,, 19, line 13, *for* ‘ Danes ’ *read* ‘ Davies.’
,, 37, ,, 11, ,, ‘ fuscocineris ’ *read* ‘ fuscocinereis.’
,, ,, ,, 22, ,, ‘ bedentender ’ *read* ‘ bedeutender.’
,, ,, ,, 23, ,, ‘ Bozer ’ *read* ‘ Bozen.’
,, 45, ,, 18 from bottom, before ‘ Wednesday ’ insert ‘ The Royal Entomological Society of London.’
,, 48, ,, 15 from bottom, *for* ‘ 1837 ’ read ‘ 1873.’
,, ,, ,, 6 ,, ,, ,, ‘ spacimens ’ *read* ‘ specimens.’
,, ,, second footnote, for ‘ *C. hirundinis* ’ read ‘ *O. hirundinis.*’
,, 82, line 14, *for* ‘ specimen’s ’ *read* ‘ specimen.’
,, ,, ,, 18, ,, ‘ beomes ’ *read* ‘ becomes.’
,, ,, The figure on this page is reversed.
,, 87, line 9, after ‘ but ’ insert ‘ differs.’
,, 88, ,, 12, *for* ‘ hardy ’ *read* ‘ hardly.’
,, 92, ,, 17 from bottom, *for* ‘ as long as in ’ *read* ‘ as long in.’
,, 158, ,, 16, *for* ‘ observe ’ *read* ‘ obverse.’
,, 163, ,, 15 from bottom, *for*
,, 182, , 4, *for*
,, ,, ,, 4 fro
,, ,, ,, 2 ,,
,, 199, ,, 11 ,,
,, ,, 4 ,,
. 215, ,, 5 ,,
footnote, *for*
,, [illegible], line 3 from bottom, for ‘ *graphii* ’ read ‘ *grapii.*’
,, 226, in section 5 of key, line 4, *for* ‘ behind ’ *read* ‘ in front of.’
,, ,, in legend of fig. 28, for ‘ *R. pulverosus* ’ read ‘ *R. bistriatus.*’
,, 239, line 16 from bottom, insert a comma before ‘ Benson.’
,, ,, line 7 from bottom, for ‘ *carinatus* Hartig ’ read ‘ *coactulus* Ruthe.’
,, 241, line 21, *for* ‘ (fig. 1) ’ *read* ‘ (fig. 2).’
,, ,, ,, 8 from bottom, *for* ‘ (fig. 2) ’ *read* ‘ (fig. 1).’
,, 256, lines 1, 11, 12, for ‘ *arithmaticus* ’ read ‘ *arithmeticus* ’ and for ‘ *fusciipennis* ’ read ‘ *fasciipennis.*’
,, ,, line 22, *for* ‘ Férrier ’ *read* ‘ Ferrière.’
,, 257, ,, 1, for ‘ *wickami* ’ read ‘ *wickhami.*’

# EXPLANATION OF PLATES.

Plate I.
,, II. New African Lycaenidae (*see* pp. 69—78, 115—127, 147—150, 202—208).
,, III. For explanations *see* pp. 151—153, 209.
,, IV.
,, V. *Cooksonia aliciae* sp.nov. (*see* p. 203).
,, IVA. Larva of *Hemerobius betulinus* Strøm (*see* p. 95).